THE
PEDAGOGICAL SEMINARY
Founded and Edited by G. Stanley Hall

Vol. XXII JUNE, 1915 No. 2

THE SCIENTIFIC PLAY WORLD OF A CHILD

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In recent years there has been an ever increasing interest in the phenomena of the child mind. Inquiry seems to show that a large proportion of people have not a very clear recollection of, or at least no great interest in the details of their own child life. Occasionally, however, we find an individual who for some reason possessed in his early years an unusually active imagination, constructing a play-universe which remains clear and impressive in memory throughout adult life. My own child life was characterized by a vivid imagination, and the world in which I lived, though illustrating very well many general principles of genetic psychology, displayed also some unusual features which I have been unable to find developed to a like extent in the experiences of other persons. Without desiring to take in any way an egotistical attitude, I shall try to describe and explain candidly the world in which my childhood from six to eleven was spent. Fortunately I have a very clear memory of the doings of these years, and especially valuable is a detailed and accurate account of the same which I wrote, while yet a child, only a few years after the events which I describe.

The activities of this play world began in crude form about the age of five, reached their most elaborate development between nine and eleven, and ceased abruptly at eleven, due to a change in residence and school life. About this same time I began to write an account of the play I had just given up, without any definite plan of completing it into a uniform

whole, but writing largely from the mere temporary interest of so doing. Thus various portions of the manuscript were added during spare times and according to momentary inspiration, for a period of three years. But as time went on I saw the possibility of making a complete history, and I also got a better perspective and understanding of my own mind; so I continued more rapidly and by the age of fourteen find that I had written a full acount of the whole play-world. It is interesting to note the changes in the childish style and the broadening of my own conception of my subject as I grew from eleven to fourteen. This manuscript contains altogether about ten thousand words, and is liberally illustrated by drawings, maps, and diagrams. It is carefully divided into chapters, and paragraphs with headings, and is rich in tabular classifications and foot-note references. In the description to follow, which I am writing at the age of twenty-one, I can do no better than to quote many passages from the original childish manuscript.

My earliest recollection of my play was a habit of talking aloud to certain stones and ashes in the back yard, which I vaguely personified. Soon I began to personify a great variety of objects and sustained certain personal relations to them—of course always to my credit or advantage. When I was about six, my sister, whom I will call B, about four years younger than I, began to appreciate and to sympathize with my ideas. She was thenceforth my ever present and only companion in this play. Beginning my history at the age of eleven, I wrote:

> "Now mamma does not let me play in the street with the other children, I was therefore home. I used to imagine inanimate things to be alive, and I would talk to them. . . . The play gradually developed and changed until, I remember, when at P. they gave me some empty spools which I took home. B. also had dolls. We made believe these were alive. Some of my early spools were by name or class: Elizabeth Rosebush, Nice Joe [from my own name], Naughty Joe, Brother the Bear, 5 other Bears, Little Bears (small spools). We named or classified our spools gradually. . . . There were families which grew larger and larger. There were also some people made out of paper which we played with. One day the spools . . . , who were mostly bears, were changed to people. . . . Later we had so many make-believe people that I divided them into systems."

By a "system" I meant a nation, or tribe, or community of similar play people. The "Reaperson System" consisted of all the "real," "alive" people in the household, including our domestic help and also the dog. These I clearly differentiated in my childish mind from all the other people, who were imaginary. My mind,—and I am led to believe this is

true to a large extent of most children—although highly imaginative, was at the same time intensely realistic and logical. But in my case there seemed to be an unusual, an exaggerated loyalty to fact and to logical consistency. The Doll System consisted of all B's various dolls; the Spool System of the spools mentioned above; the Tower System was a collection of old broken chess men; the Animal System was made up of Noah's Ark animals; the Pet System of beautiful paper ladies cut from fashion magazines; the Mystery System of originally constructed paper figures; and the Daw System of miscellaneous blocks of wood. Then out of doors we had the Stone System, another Animal System, Pet System, and De Peta System, all composed of stones varying in size from pebbles up to about twenty pounds in the case of the more dangerous "animals." Then there was the great Volcanic System, whose members at first were cratered mounds of earth out of doors and furniture or boxes indoors, but later gained the unique power of becoming disembodied spirits and traveling invisible to any place we desired.

In this universe of play people for four or five years I truly lived and moved and had my being. It was only one out of several worlds of my imagination, but of all these it was the one very realistic and concrete world and received the most attention. During these years B and I were mostly isolated, except at school, from other children, who I believed could never appreciate but only ridicule my play; and hence I had no desire to stir outside my realm or invite others within. B's social tendencies developed much earlier. How vividly I remember one occasion when I was ambling around the backyard, studiously looking at the ground and laying plans in my mind for the construction of some imaginary railroad, while on the other side of the fence stood a boy of my acquaintance, laughing at my queer behavior. How I longed to go out with an air of superiority and give him a scientific explanation of what I was doing; but at that age I was sensitive and not well versed in the rough and ready ways of the street, so I realized that any such attempt would only provoke more ridicule.

My mind of course had numerous tendencies in common with most other imaginative children, which tendencies might be explained in terms of racial inheritance. Such were the prevalent animism, the use of symbols, and the tendency to construct an ideal world of myth and story. The material content or subject matter of my play-world was necessarily taken from my real environment, and it is the nature of the experience selected and the interpretation and elaboration of that experience which is so unusual. Out of the universe

of objective facts continually pressing upon the childish senses, certain definite groups of things and their related ideas impressed my mind and became objects of absorbing interest, much to the exclusion of other facts. I called these "fads" or "hobbies," and I find a remarkable similarity between these and some of the child hobbies of Mr. L. C. Day of Clark University, who also has written of unusual childhood experiences.

My principal groups of objective interests during this period were as follows: Railroads, human physiology, astronomy—especially the moon and comets, volcanoes, extinct animals, legal trials, and a group of ideas about electricity, fire, fire alarm bells and whistles, etc. Like most children I attended to the striking, the unusual, the violent, the vigorously moving, and the mysterious elements in my environment, to the exclusion of the commonplace. But immediate personal experience was not essential to interest in my case—in fact some of my strongest interests were kindled by learning about remote objective things from my mother or from books. My mother gave me early fundamental instruction in human physiology and hygiene; and I picked up scraps of information about volcanoes, comets, criminal trials, ancient mammals, etc. Before long I was ravaging my father's library with insatiable curiosity to find out all I could about the function of the spleen, the nature of comets, the phases of the moon, and the probable size and appearance of the most hideous creatures of pre-glacial times. My interest in things scientific seemed to develop in exactly the reverse of the recapitulatory order expounded by Dr. G. Stanley Hall. I was first of all interested in the pure science—I wanted to know the facts and was irritated when the information was diluted with mythical, personal, or heroic interpretations. In Sunday conference with my mother I used to prefer straight Bible to a children's book of light conversational Bible-stories which she often used. Seldom since have I felt the same undiluted, intense scientific curiosity; in adolescence I was strongly utilitarian, and it is only in recent years that I have enjoyed the heroology of science and the mythical and poetical interpretations. But on the other hand my early interest never covered a science as a whole, but touched certain rather striking or mysterious elements such as comets and mastodons, which somehow became associated with strong ideas, feelings, and curiosity. As Dr. Hall says, the young child wants general information in abundance, but cares little for thoroughness or quantitative knowledge.

This early interest in things scientific I attribute largely to the careful instruction of my mother, who both kindled

and satisfied my curiosity, and did so with a supreme regard for objective truth. She showed me the world in a rational and a wholesome moral light, and far from crushing my imagination with cold facts, she rather stimulated me all the more to seek the truth about things. There must have been also an important inborn factor, for B, who received the same instruction, never developed the same deep, scientific interest, but inclined more to the poetic and mythical. I was going to say that she was more imaginative than I; but I cannot: the distinction is rather that she tended more to enjoy passively the myths created by others, like the average normal child; while I must rather create my own world of fancy to suit my personal tastes. Naturally enough, these tendencies were reinforced by my becoming conscious of my peculiar scientific interests, and taking a personal pride therein. I remember on one occasion, when I was about nine or ten, I had been arguing with my mother and sister. Being rather irritated by the viewpoint which my sister took, I closed the discussion by exclaiming rather angrily to mother: "Well, I'm scientific, and she's sentimental!" At the age of eight or nine I began to have strong religious doubts, which were caused not by any definite literature I had read, but by my own reasoning about the facts of life and failing to discover adequate rational sanctions for the beliefs I had been taught. But at the same time I prayed earnestly for the fears to be overcome.

From my more immediate environment I observed with intense interest the nature and operation of railroads, trolley cars, fire alarms, etc. Mr. Day, whose child-world resembled mine in many respects, had an imaginary line of railroad with accurately calculated time schedules. He published with greatest care and formality his play newspapers, as I published legal documents of the marriages of my play people. Like myself he was interested in the moon, in war, and in celebrations, which he embodied in his play. Mr. Day, I believe, took more material than did I from the real political and business world; he published news of industries, advertisements, fashions, stock markets, and battles, of which I took little notice. He also seemed to have been more patient in the little details—as in printing his newspapers; I was so impatient to express myself that I often flew into fits of anger because something refused to work out quickly and accurately the way I had imagined it.

Especially noticeable—and this one feature I have not known to be developed to a like extent in the experience of others—was my interest in objects which admitted of comparison and classification. My powers of discrimination and

comparison seemed to be developed early, and I took great delight in the contemplation of orderly series of unlike but related objects and phenomena. Thus I watched the moon with great interest, not because I saw any sentimental or mythical associations, but because of the mere pleasure of contemplating and reasoning out its changes in shape and position from night to night. Erie railroad trains were strongly differentiated from Lackawanna trains,—in fact I thought I could tell them apart by sound. Different types of locomotives were compared and given personal attributes; I used to imagine that camel-back engines were malicious, while the others were upright and good. I was very fond of time tables and maps, and knew by heart long lists of railroad stations along different lines leading out of New York. Various dolls, spools, or other characters of the play-world were compared most carefully as to strength and disposition, in fact I had a numerical scale to measure these dispositions. I used to make lists of the numbers of trolley cars observed, lists of cities visited, etc. The play-world was very distinctly and clearly divided up into the "systems," as noted above, and I took great pains to make clear to B any obscure points of classification.

This same delight in comparing and classifying showed itself later,—all through adolescence,—when I spent many days rambling alone over hill and woodland in search of flowers, trees, birds, and other objects of nature. Here also my chief delight was not to study intensively any definite phases of nature, but to list and contemplate the maximum number of species—to gather and compare the greatest variety of experience. I never made any extensive collections of the eggs, nests, or plants themselves, but made careful lists and descriptions each year of the various birds, trees, and flowers observed, which satisfied the desire as well. I keep up the practice yet with birds, listing about one hundred species every year. In nearly every case my practical interest in any phase of nature was preceded by some theoretical or book acquaintance with it. To-day I derive great pleasure from the mental comparison of persons and experiences. Every interesting experience, such as visiting a new city, climbing a mountain, or meeting a new friend, calls up hosts of clear visual images of similar experiences in the past, which are then compared and classified. I feel as if every such event added a new treasure to my mental collection. All this is probably an outgrowth of the collecting tendency, which is recognized as a specific instinct.

On the other hand I was non-receptive to many elements of life which, though they interested other children, could not

be brought in and connected up logically with my pre-established world. Everything must bear definite time, space, and causal relations to the whole, and anything non-conforming was either speedily connected, or forgotten. One evening B and I, in a spurt of imagination, created in our minds a whole new and strange system of play people called "Yucatown people" dwelling in a remote corner of our play-hall. I could not long stand for these disconnected spirits, so I constructed about a hundred crudely drawn paper figures. Then all these were placed against the end of some imaginary transmission line, and the spirits then poured into them, became embodied, and were assigned a place of residence next to the Spool people. Most of these people had been already named and characterized before they were embodied in paper. Most of the play systems of people originated thus as disconnected creations, and were then brought into relation with the rest of the world. In some cases familiar objects were personified; in other cases abstract personifications led to a search for or construction of appropriate objects to embody them. I remember one day playing "choo-choo cars" in a hammock with some other children at a country resort. It seems we started out from New York bound west, toward Chicago, and when one of the girls who was calling out the stations, after a while cried out "Boston," I objected strenuously that Boston was not on the way to Chicago but back in the other direction. She replied that we were only playing and it didn't make any difference, but it made a big difference to me and spoiled half the pleasure of the game.

As I have noted, all the subject matter originated in the more interesting elements of objective experience, such as the railroads, volcanoes, etc. These groups of ideas were now greatly elaborated and combined by the imagination into the many and varied phenomena of the play-world, fantastic indeed, but strictly logical. It was like a system of geometry built upon unreal premises, but conforming accurately throughout to the arbitrary conditions. Not contented with, or being unable fully to control the real world, I took the best parts of that world and on them built a play universe after my own sweet desire, just as an artist whose ideal is not satisfactorily expressed in nature, must embody it in a creation of his own. Further introspection shows a little more clearly just how the material was selected. Out of the total environment certain names, colors, pieces of music, objects, events, and general conceptions of things, for some unknown reason group together and set up mental complexes —we say they strike the child's fancy,—while other objects remain unnoticed. Most of the features of the play originate

in attempts to express these nameless complexes. I can certainly appreciate the word invention so well described in Una Hunt's book "Una Mary." The words like "mingy," "trando," "stowish," etc., were merely to represent certain complexes of feeling and ideas which we all have, but which we are never allowed to name because of our conventionalities of language. Children and poets now and then override custom and give expression to these mental states which are just as real as fear, arrogance, the sensation of clear mountain air, or any other state of mind. Of course the difficulty is that most of these complexes are individual. But in fact any word in good repute carries a more or less different meaning to every person. There are many unnamed impressions whose general elements are shared by many persons. Several of Una's playmates in "Una Mary" could agree very well in certain associations which gave rise to such words as "pliditrants," which stood for the idea of children alone out in the darkness, with all the mysterious and fascinating feelings associated. I coined a few words and gave unusual meanings to many standard words; and there were many other ideas which I never could name. "Queenishness," "fiercity," "Yucatown," "volcano," "current," are good examples. We shall see illustrations of this in what follows.

I shall now describe some of the "systems" and the events of the concrete play-world. B, like all girls, was brought up on dolls, of which she had very many. I had no very great interest in dolls and at first used to tease her about some of them, but soon I began to accompany her in her play with them, while she spent much of her time with my more masculine characters. I made a list of all her dolls and incorporated them, together with her other playthings, as the Doll System, which I assigned to her special care and protectorship. B and I were not calm spectators but active participants in the play events. We were of course the rulers of the universe, and our advice was sought by all the play people. We talked to these people as to intimate friends, we praised them for acts of righteousness, and the evil doers we rebuked or condemned to death. The play people were made to talk by our using several different tones of voice, deep tones for the men, soft tones for the adult women, and high, nasal tones for the dolls and other children.

"B. was regarded as the mother of the dolls and some mother or ancestor of the other parts of the Doll System. Joe (I) was the brother of B. and the father of the dolls. Papa and mamma were the grandfather and grandmother of the dolls. The Doll System is therefore more closely related to the Reapersons than any other system." [Written at age 12.]

The dolls lived in B's nursery on the second floor of our home. They were frequently annoyed by the marauding visits of several blocks of wood called "Naughty persons," from the large play hall in the attic where all the other indoor people lived. So we made and published a law that "any little naughty person that comes from the hall shall be thrown in the waste-basket." My age at this time was eight.

The Spool people at first were a few miscellaneous "bears" and persons developed by the inconsistent imagination of early childhood. But my mind grew more logical, and when I was eight, these bears, etc., were passed through a dark room in which they suffered a "Great Change," all coming forth as humans. They were then divided up into families, and the small spools, though still retaining the traditional name of "Little Bears," were apportioned as children to the several families. The "Great Change" marked the close of primitive times and the dawn of national history for the Spool people. Against the wall we built a house of boards, four stories high, for the Spools to live in. Each family had its own room, and as I kept on collecting small empty spools from my mother, some of the families grew to enormous size, and had to be subdivided, and new families added. The fathers of the four principal families did not stay in the rooms with their wives and children, but stood always on the highest roof of the house, called the "Law Tower." They were the rulers and legislators of the system. Mr. Contractiven Raymond Rosebush was the chief of these—the "Head One" (president) of the Spool System. His wife Elizabeth Rosebush had a family of some hundred "little bears." Some of the other characters were the Russel family, Mrs. Russel being the educator of all the children of the community, the Atfern family, the Claus family, Oregon family, Ocotrin family, Bama Susie, Snowdrop, and four bachelor "doctors" who guarded the health of the Spools, and also of the whole play-world. Santa Claus, the father of the Claus family, was lost at an early age in the Spool history. Although we procured another spool to take his place and name, we were never satisfied, and for over a year we anxiously searched the house for the original. The adult spools were clothed with strips of paper or colored cloth wrapped around them and tied with string. The names were taken from real persons we knew, from fairy stories, or were manufactured directly according to childish fancy.

The Yucatownal System, which as I noted previously, was a sudden special creation later embodied and connected with the other people, consisted mostly of paper figures. Except when they were taken out for action, the Yucatownal families

were packed neatly in layers in a small box, each family separated from those above and below by sheets of paper. "Yucatown" was derived from Yucca, the name of a desert tree, a word which had struck my fancy while reading geography. One of the men was Mr. Cactus. It seems the creation of these persons was associated with a mental complex of weird and fascinating images awakened by the descriptions of desert vegetation. Ideas also of mysterious people and of fireworks were connected with this complex.

This system was a rich field for the creation of names. Some of its members were Mr. Bareten, Mr. Exquisitrin, Contac, Orungutanville, Apricot, Zerzamquisitburg, etc. With these paper people was associated one character of very different substance, Mr. Belity.

"This personage was a small bell about 3 inches in diameter without clapper or handle. He was supposed to be the strongest man of his size in the play-hall, and was the most important and conspicuous member of the Yucatownal System. . . . But he was not exclusively a Yucatownal person, and took part in many affairs other than those of his own system. He acted as a judge in trials and affairs of all systems, and he was well known and useful throughout the indoor play world." [Written age 14.]

Mr. Belity and Mr. Rosebush, the Head One of the Spool System, were the principal leaders—men of affairs—of the indoor part of the play-world. They consulted frequently with B and myself on questions of international (or intersystemal, I ought to say) policy and government.

"The Yucatownal people were conspicuous for their being the seat of law in the play world. All trials, legal proceedings, etc., were usually attended to and judged by the famous Mr. Belity and his paper . . . associates, many of whom were jurors."

Marriages were perfomed by Mr. Belity, and then had to be confirmed by Mine Grasen, a distant imaginary volcano. We took great delight in conducting criminal trials, and in hearing the deep voice of Mr. Belity, with great formality, pronounce sentence upon the offender. This very often was followed by execution—another impressive ceremony. The method of punishment depended on whether the victim was made of paper, wood, or stone.

The Mystery System, also embodied in paper figures, was a weird aggregation of fairy-like people, animals, and moons, all of which had the unique power of aviation. Only rarely did they fly forth from their remote corner of the hall to take part in the busy affairs of the world. At the age of nine I had a memorable dream. The full moon yelled "O" at me in a loud voice, awaking me in great fear. This so impressed me that for several months I used to run around

yelling "O." Older persons were amused or annoyed and asked why I didn't yell some other letter of the alphabet for a change. I took up the suggestion immediately and began to shout H, Q, and other letters. No sooner done, than my mind began to build up complexes about the different letters of the alphabet, something like those of Mr. Day and "Una Mary," but not so well developed. The several letters were now divided up as symbols among the various play systems. The letters O, H, Q, C, I, R were the most dignified and important group and were associated first with the Moon, who was originally responsible for the whole business. Later they became the symbols, or totemic emblems for the more important systems—the Dolls, Spools, Yucatownals, and Mysteries. B G M N were given to the Daw System, V S T P to the Animals, and D E F L, the least important and dignified letters were given to the Pets—the completely feminine system. There were often disputes between systems for the possession of letters. Each system, like a political nation, had a flag, on which its letters and certain other emblems were placed. Each had also certain colors which were used in the flag. Colors were strongly associated with the systems, and the principal systems, like chosen races, shared the best colors, green and blue.

"Great emphasis rested on a person's favorite color. Green, blue, red, yellow, white, and pink is the order of the principal colors in respect to 'fiercity' [dignity or importance]. Green was the most dignified, noble, and important color; while pink indicated effeminacy and 'queenishness.' Thus the Pets favored pink, and the Yucatownals, Dolls, Spools, and Volcanoes liked green and blue." . . .

"One day two female mysteries were questioned about their favorite color. They answered that pink was their favorite! The Mystery System and other persons assembled, the hall was darkened [by lowering a curtain], and a terrible silence prevailed. The ladies who had thus profaned the dignity of their system by saying they liked an effeminate color, pink, were sentenced to an awful doom. They were destroyed cruelly, with teeth and tools." [Written age 14.]

The indoor Pet System was composed of paper ladies cut from fashion magazines. They were kept in layers in a box. On the lowest floor, surrounded by delicate paper napkins, were the beautiful Queen and her sisters. On the topmost floor were the "Chase Ladies," stronger, Amazon-like women who had to carry on all wars in behalf of their system. In war they were invariably defeated. The Pets, unlike other systems, were exclusively female, and were the villains of the play-world. They alone retained a queen, much to the disgust of all the other systems, which long ago had given up their kings and queens and were now governed democratically by "head ones" or presidents. My early imagina-

tion revelled in stories of royalty, but about the age of eight I began to idealize the American type of government, and reconstructed my play-world accordingly. The origin of the Pet System was in certain "pets," in the ordinary sense of that word—meaning dependent favorites or protegés—kept by some of the Spool ladies and Dolls.

Right here I can best illustrate my childish ideals of character. In the earlier ages the contrast was between "nice people" and "naughty people." The wooden male Naughty persons who were sentenced to the waste basket for marauding the nursery and injuring the "nice" dolls were the typical villains of the early years of the play-world. About the age of nine these were changed to nice people and incorporated as the Daw system, with colors brown and letters B G M N. The word "Daw" was a transformation of the former title "Naughty." The Daw people became rather "silly" and good-natured, affectionate men, but never achieved great importance. Likewise the Animals, many of whom had previously been marauders and destroyers, now became the valiant protectors of the weak. Thereafter the majority of the evil doers were female—mostly the Pets, although in the very last stages of the play (age 11) there was a reversion to the masculine type of criminality. The contrast was now between two opposite types of character, "fiercity" and "queenishness."

"A queenish person was almost invariably a female, generally a Pet,—she was effeminate, perhaps proud and haughty, and something like a queen. She generally had a soft woman's voice, something like putting on airs and too elegant talk. . . . This queenishness was despised and punished. The fierce people were those who were manly and noble and good. . . . They talked in a voice which was deep and manlike in the case of the men, or ordinary woman-like in the case of the ladies. We had a sort of paper machine for measuring the degree of fiercity of any individual. It was something like a thermometer. The Pets . . . were between 5° and 20°. Zero fiercity was such an extreme degree of queenishness that no living person was supposed to be able to attain it. The Dolls and lady Spool people were mostly between 35° and 70°; the male Spools, Towers, and Yucatownals were 40° and up to 100° or more."

Volcanoes, which we shall speak of later, were fiercer than the most manly leaders of these systems, their fiercity running far up into hundreds of degrees. There were other character types neither very queenish nor very fierce. The "silly" type was represented by the Daws, the Spool doctors, and other men who were not deep voiced and dignified like the fiercer male leaders, but witty and good natured and tenor-voiced. They were the fun makers, the drones, often annoyers. Then there was the puerile, high nasal-voiced type

of the younger Dolls and Spools, and the female "silly" type of the De Petas, who, according to my earlier manuscript, "talked with their tongues half out" and had the habit of going down in the cellar to paddle their feet in milk.

In the backyard the out door Pets, made of stone, enjoyed a reputation similar to that of their indoor cousins. They were carefully arranged in rows in a little enclosure or "house." They too were the sole upholders of monarchy, the victims of war, and the perpetrators of crime.

The De Petas were paper girls indoors, and small stones out of doors. They were the young Pets, but revolted from that system and set up a democratic government of their own, under the leadership of "Lillie Fast Coach" and "Lillie Slow Coach." Hence they were classed as "nice" and did not suffer the same obloquy as their parent system. "While yet a young system the indoor De Petas waged war with the Tower people" [made of old chess men]. The De Peta army was lined up in front of the residence of the Yucatownals. Mr. Belity, the great guardian of law and order in the play hall, being annoyed by the battle and feeling it his duty to stop it, marched forth, and taking scissors he cut off the head of "Lillie Fast Coach," the De Petas' general. The war ceased very suddenly, for my sister, whose sympathy was with the De Petas, became angry with Mr. Belity, and especially with me, who she knew was the prime mover of Mr. Belity's act. She refused to continue the game, and without her I never played with my people. I might lay plans and think over the affairs of the little world alone, but never was there any pleasure in actually playing without her sympathy and coöperation. This was one of the very few occasions in which we differed in regard to our people. At five or six I derived some satisfaction from imaginary companions, but at nine or ten the presence of B was a constant necessity for the operation of this concrete play-world. The beheaded general was soon pasted together again. In fact many of the paper characters were beheaded time and time again, and restored by pasting one more piece of paper on the rear. Thus some gradually acquired considerable thickness and strength, and others had themselves reinforced in this way for purposes of protection.

"Later on in our play, people who died were not supposed somehow to cease existence absolutely. It was very common for play people to be killed and get alive again in a short time. Oftentimes the time that the person should stay dead was appended to the death sentence. This is why death was inflicted so often for offences which seemed somewhat trivial."

Imprisonment was rare. Physical chastisement or mutilation were more common punishments for wooden people. In case of death sentence, which was usually the rule when the offender was a Pet, there were several methods of execution. Pets and other persons of low fiercity could be frightened to death by yelling O, H, Q and other letters at them, much as I was frightened in my dream. This was a purely psychical method and was convenient for trivial offences because it could be effected at a distance, and the dead one, having suffered no physical injury, could be resurrected any time we wished. Here my scientific conception of fiercity is well illustrated. Only persons of relatively low degree on the scale could be frightened to death, and the lower—the more queenish the person, the easier death could be effected. Again, the person who did the frightening must be relatively fierce—and the fiercer the executioner, the easier his task. Thus the volcanoes were usually called upon to perform this solemn duty. And furthermore, the letters yelled at the victim varied in their power to frighten, a deep, prolonged, mournful "O" being the most fatal, and H, Q, C, I, R in order being less fearful. In other words, the possibility of inflicting death by fright varied directly as the fiercity of the executioner, as the fear potency of the letters used, as the number of repetitions, loudness, etc., of the yelling, and inversely as the fiercity and general resisting power of the victim. I never as a child expressed it in this way, but I certainly had such a conception, and if I had known algebra at the time, would undoubtedly have formulated something like the above statement.

More serious crimes, however, such as injuring or annoying "nice" people, demanded physical destruction. Paper people were beheaded with scissors or hanged until the noose cut them in two. Wooden persons were broken and bruised. The most impressive and delightful form of execution was "mashing," which was the out of door method for all stone criminals. The offender was placed on a traditional mashing block and was crushed by repeated strokes of a heavy iron. Sometimes he, or more usually she, was merely broken into a few smaller pieces which then became new personalities. For the worst crimes, however, the death sentence read "shall be mashed to powder," and the grinding continued until the evil doer was thoroughly pulverized, and the soul thereof was banished entirely from the concrete world of play. If the stone was too hard to be broken by this iron, then we sent a hurry call for the Gondrondontherium—the chief of the Stone Animal System, weighing about twenty pounds; and he was dropped a few times upon the victim.

I remember one day taking all the yard play people by railroad out of their homes and assembling them to witness a mashing. After the execution there was so much trouble to put them all back in their places that I grew impatient and flew into a fit of anger. Stone people were sometimes poisoned to death by "mucitrin," a vile mixture of water, mud, and wood ashes, which we kept in a bottle. We had a row of several of these bottles filled with water and ground up chalk or stone of different colors, called the "colored water bottles." The powder of dead stone people scraped off the mashing block was used to make various medicines and concoctions.

In the yard we had also railroads, some of the male stone people making up a railroad company. I constructed a handsome little bridge of sticks, flat stones, and earth, and dug trenches in which I laid lines of twigs for telegraph wires. It was a rare treat to be allowed by mother to play with water, and one can well imagine the flooded rivers, volcanic eruptions, new chemical concoctions, and mud-stained clothes that resulted.

In my study of geography nothing so interested me as the descriptions of volcanoes and their eruptions. I was also greatly fascinated by fires and explosions, whether actually observed, or learned of indirectly. We lived two doors from the principal fire-house of the town, and almost in our backyard stood the tower which carried a huge alarm bell, audible for two or three miles. I soon got to know all the alarms, and the bell made a sort of weird, half-fearful impression on me. It was not so much the horses and engines which interested me, as it is with so many boys, but the dismal sound of the bell—and the wondering where the fire was and whether it would be brilliant enough to see. I can recall being awakened at midnight by the chorus of all the fire bells in town, to find half the western sky filled with blaze, and hot coals showering down about us. This and similar experiences became associated into a complex of fear, wonder, and not a little positive delight, which is even to-day aroused in me by a night conflagration. As usual, these strongly feeling toned ideas expressed themselves in my play. I used to spend hours drawing pictures of Mount Vesuvius in eruption. I covered many sheets of paper with red fire, guns, murders, and dynamite. Again, I had a peculiar fascination for and interest in water-pipes, electric wires, and all kinds of long tubes and passageways; with thrills of pleasure I imagined the violent rush of water or electric current through them.

In the yard I heaped up a mound of earth, dug a crater

in the center, and named it Mount Vesuvius. Now and then an eruption took place, dirt and stones being thrown all over the yard. In the house of course I must have another Vesuvius—it was a large box of waste paper and other trash in the corner of the play hall. When an eruption was due, we darkened the hall, rolled the large wooden "thunder ball" up and down the floor; then Vesuvius poured forth its contents, knocking down the Spool people's house and scattering the débris all over. Then mother would come upstairs to see what had happened; and B and I set to work to build up the house, collect the Spools, and with practically no error, put them all back in their proper families and rooms. In country places which we visited we called some of the nearby hills volcanoes, giving them such names as "Mine Grasen." About the age of nine I made a grand synthesis of all these disconnected ideas about volcanoes, fires, etc., and called it the Volcanic System. The last two years of this play-world, which ceased at eleven, were marked by elaborate law and order. All the separate spontaneous creations of earlier childhood had been gradually unified into one great realm, and the Volcanic System was a sort of all-pervading metaphysical background which bound all things together and explained all phenomena. At home in the winter we missed the friendship of the Volcanoes we had lived near and talked to all summer. We communicated with them, and finally we began to dissociate the Volcanoes themselves from the material hills which represented them. Henceforth all volcanoes were purely imaginary spirits which could travel from place to place, and could inhabit any mountain, tree, pole, or piece of furniture at will. This was the first and only considerable departure from the concrete. B was too young to conceive of the Volcanoes just as I did, but I gave her diligent instruction, and we got along fairly well.

Once freed from their corporeal limitations, the Volcanoes became a rich field for imagination, and they rapidly increased in number, until I had so many purely imaginary beings that I had to classify them. Here my classifying fever exerted itself to the utmost. First there were the two Vesuvii, Mine Grasen, and other old friends. Then there were a host of Volcanoes associated only with numbers from 1 to 100, 100 to 1000, and then by thousands up to the millionth, and so on to the unheard of number Madrackankantillion. Then there were some which were lettered a, b, c, 2a, 2b, 2c, etc. Finally there were the Animal Volcanoes,—a great host of elephants, mastodons, dinotheriums, megatheriums, and all the other geologic animals I had so eagerly read about. But here as elsewhere, after the realm of scientific facts—even

pre-glacial facts,—is exhausted, still the childish imagination is unsatisfied, and has to extend the system by creations of its own. Thus I invented the Gondrondontherium, the most terrible of all nameable Volcanoes, and though he was a pure spirit, in blackest colors I drew his picture. (There was also a concrete stone Animal of the same name and characteristics.) Not content with the tabulation of these Volcanoes, I had to visualize their positions in a vertical circle, representing a sort of hierarchy arranged in order of fiercity. As we ascend the scale of Animal Volcanoes they become more and more terrible, their degree of fiercity far transcending the most dignified governors of the concrete systems. The Gondrondontherium was not the ultimate; just above him in rank was one so unspeakable that he was called the "Animal Without any Name," or for short, the "First Fiercity." There were twelve of these Animals without any Names, each one fiercer than the preceding. The highest one, called the "Twelfth Fiercity," was the supremely and ultimately terrible, the king of all Volcanoes, and a kind of god of the whole play-world. We never tried to represent him concretely, and seldom talked of him or communicated with him. The First Fiercity was the highest that could be pictured, and he was sketched as a jet black, almost shapeless animal with fiery eyes, sitting upright like the prehistoric megatherium.

I imagined a network of "currents" which were hollow pipes or tunnels running underground, through the beams of the house, and through railroad tracks and sidewalks. These served as lines of communication between different parts of the play-world, and also as passageways for fire, water, electricity, and as routes of travel for the spiritual Volcanoes. Through the currents flowed periodic "rushes" of electricity, which rang fire bells, blew whistles, or if the pressure were too high, caused "current-bursts" and fires. Three or four hundred "Curreworrelus Volcanoes" were employed to travel about and keep the currents in good repair and attend to "bursts" and fires. Evidently these ideas were a fusion of crude hydraulic and electric notions. I had a schedule of fire alarms for different parts of the play-world. Just before supper occurred "negetal time," which was rung out on a dinner bell supposedly by the current mechanism. The word was derived from portions of three words, "no," "get," "alive." It meant that any play people who had died or been killed during the day could not be restored to life after the ringing of this signal; they must wait until next morning. Frequently we recorded the accuracy of our supper time, which was supposed always to be ready twelve

minutes after negetal time. Wednesday was the most active day of the week for the currents and Volcanoes; the pressure was then the highest, and fires and explosions most frequent.

Illustrative of the conception I developed of my play-world during its later history (age 10-11), one of the paragraphs in my 13-year old manuscript is headed "Advanced science of the play people." It describes their methods of punishment, their life, death, and character, and is explained with this Volcanic System as a basis. The Volcanic System was in a sense the religion and philosophy together of the play-world. The imaginary frightful, Animal Volcanoes certainly correspond in character to primitive gods. All play people who had been entirely destroyed were vaguely conceived of as dwelling among the world of Volcanoes. No doubt these ideas were due to a combination of religious teaching with a desire to construct a logical system. The volcanic spirits were positively known about, and even communicated with, by the play people. It resembles perhaps a religion which would be developed by savages. It embodied chiefly wonder and fear—but the play people, not myself, were the subjects of those feelings. Religious love, ecstacy, reverence, or piety did not exist in this connection. The play bore no relation to my real religion which was associated wholly with my real life. The words God, devil, heaven, hell, etc., were never used or thought of in connection with play.

I have already traced the evolution of this play-world. The general process was in most cases first an idea taken from experience; second, an association of ideas and feelings into complexes; third, the expression and further elaboration of these complexes of ideas by play creations; fourth, the synthesis of all these separate creations into a consistent play-world. At first I demanded concrete representations for everything, later I began to revel in pure imagination.

In the summer just before I was eleven

"Mr. Bamahead, a foolish and naughty member of the Tower System, had in our imagination done some misdeed; and we planned to punish him when we should return home. Accordingly, upon our arrival, we destroyed the unruly Mr. Bamahead in the upper hall. His end was also the end of the whole complicated thing. Interest in our play people declined, for I had now reached the age of eleven, when it was best I should give up these childish things." [Written at age 14.]

The same autumn marked my entrance into high school, and our change of residence to the city nearby. Our play people were taken along as relics, or otherwise disposed of. The whole host of paper people, instead of being carelessly thrown away, were formally beheaded, one by one.

"If we had moved a year or two earlier, I would have insisted upon taking along every stone of importance in the back yard. Thus ended our play. To-day there still exist the numerous spools, towers, etc., but they are no longer endowed with life. Once they seemed like living creatures, but now only like pieces of wood." [Conclusion of manuscript—at age 14.]

My imagination at times cultivated other fields besides this play-world. I cared not much for fairy stories or novels: I wanted to create my own stories and myths to suit myself. My reading was chiefly scientific—to satisfy my curiosity. B, however, was more receptive toward the creations of others; so we made an ideal combination. I would make up the stories and tell them to her, being very careful to explain in detail all the when, where, and why, of which most children's story writers are rather careless. I wanted her to see the picture which was clearly visualized in my own mind. She would listen and enjoy, and perhaps ask questions, which I took great delight in answering. Besides my concrete play-world in the house and backyard, I had another universe existing wholly in imagination, which was the setting for hours of personal reverie, map and picture drawing, and telling of tales to B, during the times when we could not or were tired of playing with our people. This world was entirely separate, except for certain names common to both, from the concrete world. But it also was a logical unit, and most all the varied stories I told were finally located geographically in this story-universe. I have drawn several maps of it. Like the rest of my play, it was the real world modified to suit my tastes: it was based on a crude map of the United States, with New York, Chicago, and Buffalo fairly well located, but all the intervening country distorted, reconstructed and given imaginary names. The principal city of this realm was not New York, but a nearby town which was identified with our actual home, and was the home of the heroes of all the stories. These heroes were usually B and myself. Like the play-world, this story world had color elements. Midway between New York and Chicago was the important and mysterious city of "Greeniarten." This was the destination of the "Greeniarten Special," a very fast and green colored express train which left New York about 6 A. M., and made its trip west in about twelve hours. On this splendid train ourselves in the story were wont to travel. Next in importance and farther east was Bluetown, then Redville, Pinkville, Whiteville, etc. In this ideal geography there took place railroad wrecks, great fires, volcanic eruptions, crimes, and also peaceful journeys and visits by the heroes. Kings and queens from other countries sometimes

visited us, who were the democratic rulers of this country. All such journeys, however, were narrated so as to be consistent with the railroad schedules and the distance between the places in question. The most active imagery centered about the railroads. Some years after I had outgrown the concrete play, I was still mapping the cities and sketching the railroad trains of this realm. Even to-day in spare moments I sometimes imagine myself riding through that mysterious country.

We had a large play house in the yard, containing an express wagon, the Stone people, etc. At the time I was interested in physiology, we sometimes suspended our usual activities and made believe this house was a person. Several boxes, cans, pails, etc., were then placed inside in proper position to represent the different bodily organs, stomach, lungs, heart, liver, spleen, kidneys, etc. Then we would play disease, and would have to operate on the house and remove one of its organs. The favorite disease was some mysterious, incurable malady called "constinstibus," which had its seat in the spleen, a gland of mystery, for I had searched many text-books and encyclopedias to learn about its poorly understood function. Doctors were summoned, and if after an examination they gave with bated breath the verdict "constinstibus," we knew the result was inevitable. The disease progressed rapidly and always culminated in a fatal explosion (*i. e.,* a general "roughhouse"), which wrecked the whole organism, as we with much yelling and delightful violence threw its various entrails all over the yard. In the house we sometimes mapped out the human anatomy on the floor with lines of cards, the careful arrangement being soon shuffled up violently by disease. We also constructed a human body out of a paper envelope with the various organs sewed or pasted in position inside.

We do not wholly lose our childhood. Many of these childish interests and ideas have not been destroyed or even greatly lessened in my own mind. They are merely transformed, or are overshadowed by the more pressing interests of later practical life. The tendency to personify objects grows less, but possibly only because the desire for companionship and the personal interest are satisfied by one's much wider acquaintance with real persons. Many of the old complexes persist with the same intensity. I still have a peculiar interest in railroads and feel certain undefinable thrills when I am traveling. I watch the changes of the moon with much of the old interest. Occasionally my mind returns to the land of stories.

These childhood fancies certainly resemble dreams and cor-

respond to racial myths. Parts of my play were created in dreams, and like them, represent a kind of ideal or wished for state of affairs. My own play, as I have noted, was marked by unusual loyalty to science, facts, and logical arrangement. I do not, however, consider it as an exception to any essential psychogenetic principles. Variations are matters of individual interest. Due to heredity, and very largely to education, I developed at an early age an intense matter of fact curiosity about things. But though precocious in my mental grasp of impersonal things and hence far ahead in school, I was somewhat backward in perceiving the intricacies of human nature and in adapting myself to social situations. Yet I had animism in abundance—it was, however, an original imaginary creation upon facts, and clearly differentiated from facts, except in the early years before six. It was not a passive acceptance of the fairy tales of others. It never prevented me from knowing and seeking the truth: the cold, scientific facts themselves carried just as pleasing complexes to me as myths carry to children educated otherwise. To me truth was much more wonderful than the fiction invented by others, but my own fiction was better still.

There seems to me only one essential reason why, for example, the knowledge that the stars are tremendously distant, immense suns should give any less satisfaction to a child than the idea that they are bubbles or diamonds or gods. It must be either because the child inherits a racial predilection for bubbles, diamonds, gods, etc., or because his previous education has built up pleasing complexes about such things, and relatively unpleasant or indifferent associations with distant suns, earths, or stones. Since education is subject to control anyway, the only essential point seems to be that the child needs a conception of things to harmonize with his state of mental evolution. And the main characteristic of this, for our purposes, is the need of animistic rather than impersonal conceptions. The young mind, like the savage, ascribes all motion to persons, and sees the world as a reflection of himself. But why preserve this conception to the exclusion of all others? My own case suggests how all the joys and genetic functions of animism may coexist with an early understanding of reality. Why not always satisfy the child's curiosity by telling him the truth, but presenting the truth amid a wealth of suggested associations, both mythical and scientific, so as to give free play to all types of imagination? The child would then be free to seek mere myths, or to create his own myths, or to inquire further into cold facts, according to his disposition. Such a method would offer a much wider field for the child's interest and pursuit

of what is worth while than impossible tales that can never lead him any farther except into greater error. He would thus begin early to appreciate truth as truth, and fiction as fiction, and would not fall into errors soon to be dispelled with a shock.

How prevalent are these early misconceptions is shown by a question put to 553 school children by Miriam B. Levy: "How did the man get in the moon?" The ages ranged from four to fourteen, the bulk being between eight and twelve. Only 48 answered that there was no man there, although perhaps we must allow for the suggestive force of the question. Fifty attempted a scientific explanation, while the remaining 457 gave crude arbitrary explanations or failed altogether. There is little evidence that these 457 false notions were sources of any great joy or interest-incentive to the children.

The childhood I have described suggests many important questions. What are the relative weights of heredity and of early education in determining the bent of a child's mind? The comparisons made between B and myself certainly seem to point to strong inborn factors—but even there the evidence is not conclusive, because two children can never have exactly the same environment, and a slight turn one way or another in the earliest years may determine the whole future course. Again, is it wiser to encourage a child's free mingling with many others at an early age, developing his social qualities and adaptability, or to encourage a certain degree of aloofness and self-reliance, thus giving play to individuality and independent creative thinking? Or does the child himself by his inborn traits determine which course shall be pursued?

I have described only a portion of the great world of ideas and activities which made up my childhood. I feel that its memories will always enrich my life, and I congratulate those who are so fortunate as to have similar vivid recollections. Studies of this kind, I believe, give a deeper insight into the child mind, and a greater sympathy with the inner life of other people in general.

A CHILD'S VOCABULARY AND ITS GROWTH

By James Richard Grant, University of Arkansas

There has been a great deal written on the vocabulary of children, yet the average teacher or parent greatly underestimates the average child's vocabulary. One hundred teachers were recently asked to estimate the number of words a child could use intelligently at the ages of one year, two years, etc., up to the age of six. It is interesting to see how few words a child is supposed to know. The maximum and the minimum of the estimates with the average of all are as follows:

1 year	old,	0-50,	average	12;	4 years	old,	20-1500,	average	222
2 "	"	4-200,	"	59;	5 "	"	30-1500,	"	312
3 "	"	10-1000,	"	135;	6 "	"	45-2000,	"	472

The estimates of the same number of parents were even lower on the average.

These estimates are not so far from the true average as the tables on pages 191 and 192 would indicate. There are very few vocabularies recorded by anyone except parents. Most of the children are from homes above the average. Again, not many parents will publish a record of the child's vocabulary unless it seems to be above the average. We know two-year-old children who say very few words. Dr. W. F. Jones, of the University of South Dakota, has made an extensive study of the writing vocabulary of 150 children from each grade beginning with the second and including the eighth. He, with the aid of others, read more than fifty written lessons, essays, etc., from each of the 1,050 children taken from four states. After handling more than 15,000,000 words, Dr. Jones arrives at the following conclusions. The average second-grade child has a writing vocabulary of 1,927 words. The gain of each grade over the preceding was as follows: 3d, 469; 4th, 442; 5th, 432; 6th, 425; 7th, 469; 8th, 418.

Biography

Bertie Elizabeth Grant was born in Greenwood, Arkansas, April 15, 1912. Her parents are of Scotch-Irish descent. Both are university graduates and teachers. Her mother taught until four months before Elizabeth's birth. With the exception of one attack of croup and a light siege of mumps,

E does not know what it is to be ill. Her health is due to watchful care as well as to inheritance. She has an excellent physique, and at times her parents feel that she has more strength, energy, and initiative than are conducive to the welfare of all concerned.

She has lived in an environment that is hardly normal. She is twenty-six months old and has traveled approximately 4,000 miles. Half of this took place, however, before she was five months old. She has had no regular associates except her parents. Being the only child, she has naturally been with one of them almost continuously. E is a great lover of nature. She enjoys gathering flowers, watching bugs and birds, collecting little rocks, etc., for hours at a time. She is happiest, however, when in the company of little children.

She climbs upon the piano stool and sits for half an hour at a time striking the keys. She says she is "playing Mother a song." She will stand at the window and listen, all but motionless, to any musical instrument that a neighbor may be playing. From her first birthday she has kept time to music or any rhythmical sound with her whole body, and now she often dances to music that "demands" it. This was never taught her.

E stood alone the day before she was ten months old and began walking about two months later. By the time she was two years old she could put on her shoes and button them. When she first learned this she often unbuttoned them just for the fun of rebuttoning them. She could put on most of her clothes and button any of them that buttoned in front. She used the scissors fairly well to cut both paper and cloth. One of her chief delights is to get a needle and thread and "sew scraps." She has fed herself since she was twenty-two months old. She is now old enough so that she often wants to help her mother "make up the bed," "wash dishes," "sift flour," etc.

Vocabulary

Method of Securing Data

From the time E began to talk her words have been taken down daily. No word has been put down until E used it intelligently of her own accord. There has been no special effort to teach her new words. This method is subject to inaccuracies because (1) her parents could not be with her all the time; (2) while in the presence of strangers E did not talk much, though we could not say that she was learning no new words. But these inaccuracies have been met in part (1) by close observation after E had been neglected;

(2) by studying the vocabularies of other children and testing E on words she had not used.

Tables and Curves

In arranging the tables and curves presented below very little originality is claimed. The information collected by others has been rearranged and used. Special credit is due Pelsma (27) and others for a great deal of the information found in the comparative table of vocabularies. Curve III is accurate for about 20,000 words taken from an abridged dictionary.

The similarity between Curves II and III is very marked. The general shape is the same. The words beginning with *s* stand highest in each curve and those with *x* at the bottom. When E was eighteen months old her parents, seeing from Kirkpatrick, Mateer, and others that *s*-words usually headed the list, predicted that this would not be so in E's case. She had much trouble pronouncing them; *e. g.,* she called "smoke" *poke,* "smell" *pell,* etc. The only reason that sounds logical for *s*-words standing highest is that there are more of them. There are some differences in the two curves. This would naturally be expected. But if all the words in the language were represented in the curve, it might be changed. It would be interesting to get a graph of the words in the language by parts of speech and compare it with the graph on page 190. But most words can be used in so many ways that such a graph was found all but impossible. The graph shows the words as E used them.

The general shape of Curve IV, showing the number of words E learned each month, is a steady rise. It will be observed that there is no plateau, but there is a falling off in some months and a great rise in others. This can be explained in part, at least, (1) by difference in E's environment; (2) by the difference in opportunity that her parents had for getting each new word that was used. Her vocabulary grew slowly but gradually until she was nineteen months old. In her twentieth month she learned as many words as she had during the three months preceding. When E was nineteen months old she knew about 160 isolated words. It is at this time that she begins to put them together. She got so much pleasure in "talking" that she tried to say something about everything she saw. Her parents, too, enjoyed the talking to such an extent that but few, if any, words were missed. But why is there a falling off in the next month? This cannot be explained by reason (1) or (2) as given above. But the "new" had worn off, and probably E was less jubilant and did not care to use her newly acquired means of com-

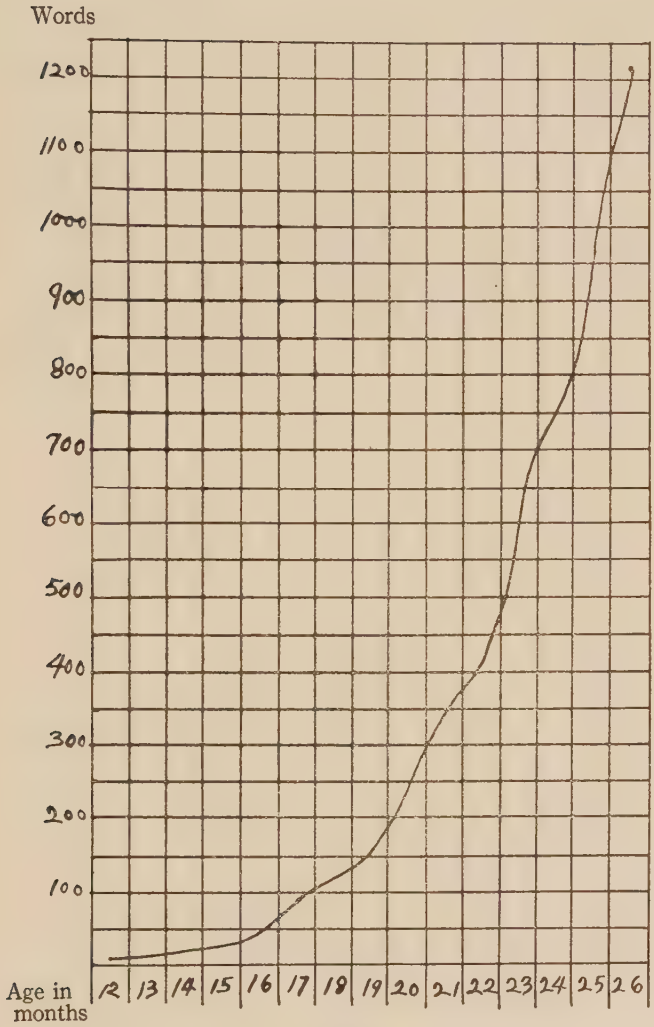
munication so much. Again, her parents may not have been listening so attentively for "the next new word."

In her twenty-second and twenty-third months E's record runs high. The weather was very cold and snowy during these two months and she stayed in the house most of the time. This gave one of her parents a chance to be with her almost constantly. Since she could not play out of doors, talking formed a great part of her entertainment and many new words were learned.

The next two months, the twenty-fourth and twenty-fifth, are off months for E. A great part of the time E and her mother were visiting relatives. "Taking down words" requires a little more energy, patience, and perseverance than one might think. While visiting, E was away from her mother a great deal. It was also easy to let words go for three or four days before putting any down. Thus some were forgotten. Again, in the presence of strangers E did not talk so much as she did at home.

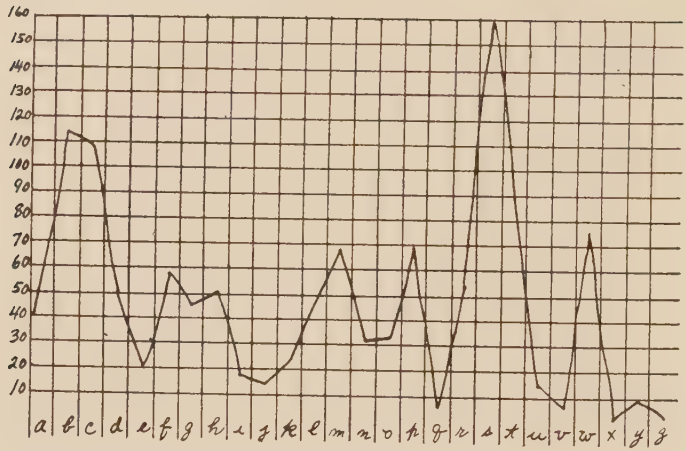
The record for the twenty-sixth month shows that E learned 264 words. Some of these were learned previous to that month. This being the last month for her final record, she was tried on doubtful words that were found in the vocabularies of other children. Thirty-one words were added in this way. Since it was not known where these properly belonged, they were put in the list for the twenty-sixth month. This close observation for new words during the twenty-sixth month is already having its effect on E's record for her twenty-seventh month, which is half gone with only 73 new words thus far.

There could be much said regarding Table I. E's vocabulary is made up of 50 per cent nouns. By referring to the comparative table of vocabularies it will be seen that most vocabularies are made up of even more than 50 per cent of nouns. In general, the proportion of nouns to the entire vocabulary decreases as the vocabulary increases, and the proportion of verbs increases accordingly. In E's twenty-fourth month the nouns increase because she was visiting and learned twenty-three proper nouns.



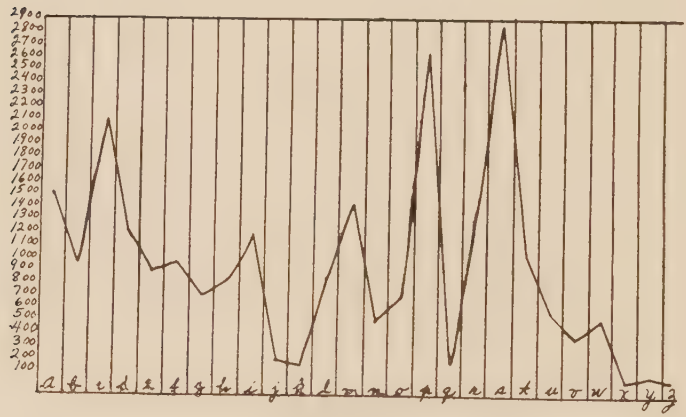
CURVE I

Learning curve, showing growth of vocabulary



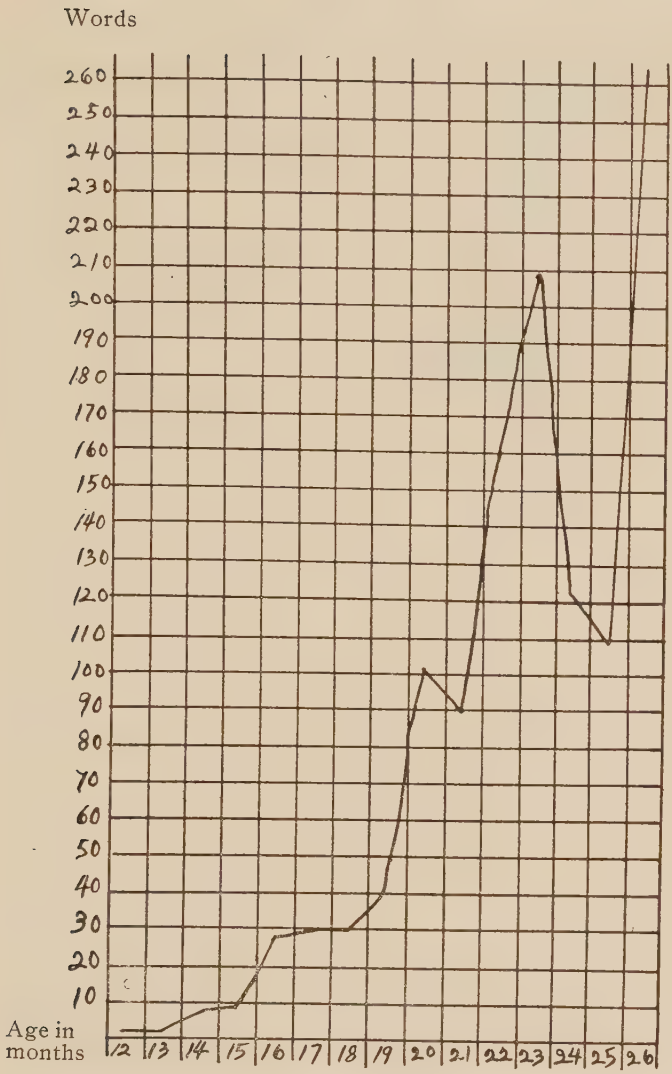
CURVE II

Number of words learned beginning with a, b, c, etc.



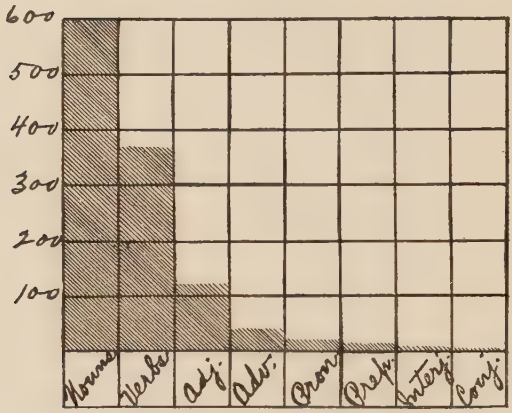
CURVE III

Number of words in an abridged dictionary beginning with a, b, c, etc.



CURVE IV

Number of words learned each month



Total number of nouns, verbs, etc.

TABLE I

Number of nouns, verbs, etc., learned each month

	Age in Months															Total
	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	
Nouns..	2	2	4	5	19	24	24	30	68	67	81	76	66	37	103	608
Verbs...	..	1	1	1	4	1	3	7	26	16	54	81	37	42	97	371
Adjs....	..	..	1	2	1	4	..	3	6	7	14	27	11	18	34	128
Advs...	1	..	..	..	1	..	3	1	..	..	10	10	2	4	10	42
Prons...	..	..	..	..	2	..	..	..	..	..	..	5	1	4	12	24
Preps...	..	..	..	..	..	..	..	..	.	..	..	6	4	2	5	17
Interjs..	..	..	..	..	..	1	..	..	1	..	2	1	..	2	..	7
Conjs...	..	..	..	..	..	..	..	..	..	..	..	1	..	..	3	4
Total.	3	3	6	8	27	30	30	41	101	90	161	207	121	109	264	1201

TABLE II

Comparative table of vocabularies

Authority	Ref.	Age of Child	Total No. of Words	Nouns	Verbs	Adjs.	Adverbs	Pronouns	Preps.	Conjs.	Interjs.
Grant.....	..	12m. G.	3	2	..	..	1	..	..	..	..
Hall.....	13	12m. B.	24	19	2	..	..	..	..	..	3
Mickens....	24	12m. G.	3	2	..	..	..	..	..	..	1
Moore.....	25	12m. B.	6	6	..	..	..	..	..	..	..
Pelsma.....	27	12m. G.	10	7	1	..	2	..	..	..	..
Perez.....	45	12m. B.	10	6	2	2	..	..	..	..	..
Tracy.....	36	12m.	10	6	..	2	2	..	..	..	..
"	"	12m. B.	8	7	..	..	1	..	..	..	..
Grant.....	..	13m. G.	6	4	1	..	1	..	..	..	..
Hall.....	13	13m. B.	38	30	3	1	..	..	..	..	4
Grant.....	..	14m. G.	12	8	2	1	1	..	..	..	..
Hall.....	13	14m. B.	58	44	6	3	1	..	..	..	4
Mickens....	24	14m. G.	15	13	..	..	1	..	..	..	1
Grant.....	..	15m. G.	20	13	3	3	1	..	..	..	..
Hall.....	13	15m. B.	106	84	8	7	3	..	..	..	4
Mickens....	24	15m. G.	27	21	..	3	2	..	..	..	1
Grant.....	..	16m. G.	47	32	7	4	2	2	..	..	..
Hall.....	13	16m. B.	199	141	28	17	5	2	1	1	4
Jegi.....	17	16m. G.	75	50	13	3	4	..	..	1	4
Mickens....	24	16m. G.	44	36	1	4	2	..	..	..	1
Grant.....	..	17m. G.	77	56	8	8	2	2	..	..	1
Hall.....	13	17m. B.	232	156	37	20	5	3	5	1	5
Mickens....	24	17m. G.	77	66	4	4	2	..	..	..	1
Tracy.....	36	17m. G.	35	22	4	2	4	..	..	..	3
Dewey.....	8	18m. G.	144	76	41	2	9	9	..	..	7
Grant.....	..	18m. G.	107	80	11	8	5	2	..	..	1
Jegi.....	17	18m. B.	60	36	16	3	3	..	..	..	2
Mickens....	24	18m. G.	116	97	9	7	2	..	..	..	1
Watson....	11	18m. G.	74	57	3	6	2	..	..	..	6
Dewey.....	8	19m. B.	115	69	24	13	3	..	..	..	6
Grant.....	..	19m. G.	148	110	18	11	6	2	..	..	1
Mickens....	24	19m. G.	142	111	19	8	3	..	..	..	1
Grant.....	..	20m. G.	249	178	44	17	6	2	..	..	2
Mickens....	24	20m. G.	187	139	24	16	4	1	2	..	1
Grant.....	..	21m. G.	339	245	60	24	6	2	..	..	2
Mickens....	24	21m. G.	216	150	22	20	5	1	2	..	10
Tracy.....	36	21m. G.	177	148	14	6	5	2	..	..	2
Grant.....	..	22m. G.	500	326	114	38	16	2	..	..	4
Mickens....	24	22m. G.	221	185	49	27	11	2	4	1	2
Tracy.....	36	22m. G.	69	37	9	4	8	1	..	..	1
"	"	22m. G.	27	16	3	3	2	..	..	..	1
Grant.....	..	23m. G.	707	402	195	65	26	7	6	1	5
Mickens....	24	23m. G.	352	226	70	31	15	3	4	1	2
Tracy.....	36	23m. G.	136	95	16	12	7	3	..	1	2
Gale.....	10	2yr. G.	436	232	99	49	27	12	8	1	8
"	"	2yr. B.	115	69	17	17	8	..	2	1	1
"	"	2yr. G.	578	293	129	70	38	27	13	6	2

TABLE II—*Concluded*

Comparative table of vocabularies

Authority	Ref.	Age of Child	Total No. of Words	Nouns	Verbs	Adjs.	Adverbs	Pronouns	Preps.	Conjs.	Interjs.
Gale	10	2yr. G.	400	247	82	36	23	4	4	..	4
"	"	2yr. B.	729	417	171	68	36	10	9	..	17
"	"	2yr. G.	741	395	159	97	27	11	4	..	49
"	"	2yr. G.	783	555	103	20	27	12	4	..	12
Grant.....	..	2yr. G.	828	468	232	76	28	8	10	1	5
Heilig.....	14	2yr. G.	455	..	..	..	..	..	..	..	..
Holden.....	15	2yr. G.	483	285	107	34	29	Mis	cella	n'us	28
Humphreys	16	2yr. G.	1121	592	282	113	56	35	28	6	9
Jegi.....	17	2yr. G.	1227	727	238	139	54	21	24	4	20
Mickens....	24	2yr. G.	427	256	94	40	24	6	4	1	2
Moore.....	25	2yr. B.	475	306	92	38	14	11	Mis	cl's	14
Pelsma.....	27	2yr. G.	379	212	88	37	21	8	6	1	6
Tracy.....	36	2yr. G.	263	168	52	22	7	7	4	..	3
Grant.....	..	25m. G.	937	505	274	94	32	12	12	1	7
Mickens....	24	25m. G.	507	302	101	53	33	8	6	2	2
Tracy.....	36	25m. G.	250	196	28	15	5	3	3	..	..
Grant.....	..	26m. G.	1201	608	371	128	42	24	17	4	7
Mickens....	24	26m. G.	587	335	121	60	47	11	8	2	3
"	"	27m. G.	675	382	139	66	62	11	9	2	4
Tracy.....	36	27m. G.	171	113	27	16	10	2	1	1	1
"	"	28m. B.	677	422	136	69	23	9	12	2	4
Gale.....	11	30m. G.	769	444	149	103	30	19	11	5	8
"	"	30m. G.	1509	913	310	157	61	16	16	..	36
"	"	30m. B.	1432	797	310	154	75	33	25	10	28
Heilig.....	14	30m. G.	1111	..	..	..	..	..	..	..	..
Tracy.....	36	30m. B.	327	132	87	42	31	18	12	3	2
Watson....	11	30m. B.	480	257	124	50	21	10	10	6	2
Boyd.....	3	3yr. G.	1657	918	344	200	109	30	29	21	6
Bush.....	5	3yr. G.	1944	1042	506	214	75	50	33	11	14
Gale.....	10	3yr. G.	1176	675	238	143	53	33	17	7	10
Heilig.....	14	3yr. G.	2153	..	..	..	..	..	..	..	..
Pelsma.....	27	3yr. G.	681	406	147	65	31	14	9	1	8
Whipple....	39	3yr. B.	1771	993	391	209	89	33	24	8	24
Kirkpatrick	20	46m.	685	108	217	49	94	186	19	5	27
Mateer....	23	4yr. B.	1020	578	211	125	51	21	4	12	18
Pelsma.....	27	4yr. G.	1278	730	265	135	86	23	19	5	15
Rowe.....	28	4yr.	2346	1207	679	268	107	23	24	9	19
"	"	6yr.	3950	1900	949	400	137	26	26	11	21

Detailed Vocabulary

There seems to be no standard as to what words shall be included in vocabularies of children and what words shall be excluded. In E's vocabulary all plurals have been excluded except those that are irregular or those learned before the singular form. Up to the present all verb forms are included. This has been done in most vocabularies of two-year-old children. The reason is both psychological and grammatical. The sixty-four proper nouns have been included. All words used only in songs and Mother Goose rhymes have been excluded. E has some expressions that may well be called interjections, but these have been left out. She also has a few "bywords" that have been left out. A child's vocabulary so portrays home life that in some ways it seems best to reduce it to the minimum.

VOCABULARY BY MONTHS

Twelfth Month

Nouns—2:—baby, bye bye.
Adverbs—1:—now.

Thirteenth Month

Nouns—2:—hat, howdy.
Verbs—1:—go.

Fourteenth Month

Nouns—4:—bread, cup, milk, spoon.
Verbs—1:—come.
Adjectives—1:—more.

Fifteenth Month

Nouns—5:—cap, cracker, dinner, dog, supper.
Verbs—1:—eat.
Adjectives—2:—black, good.

Sixteenth Month

Nouns—19:—Annie, apple, bell, Bertie, boy, comb, dress, egg, flower, hand, horse, juice, minute, mouth, "ogy," paper, peach, pin, shoes.
Verbs—4:—peep, please, thank, want.
Adjectives—1:—hungry.
Adverbs—1:—on.
Pronouns—2:—it, you.

Seventeenth Month

Nouns—24:—bib, bottle, button, buttoner, chair, chicken, Daddy, ear, eye, foot, forehead, hair, handkerchief, lady, medicine, mother, no, nose, 'phone, pocket, scissors, tick tick, umbrella, wee wee.
Verbs—1:—ring.
Adjectives—4:—clean, dirty, hot, pretty.
Interjections—1:—whoa.

Eighteenth Month

Nouns—24:—ball, bed, book, buggy, broom, brush, butter, chin, "choo choo," cream of wheat, Dan, doll, drink, feather, gloves, knife, light, mule, pencil, pick, spool, supporters, teeth, yes.
Verbs—3:—do, gone, stick.
Adverbs—3:—down, off, up.

Nineteenth Month

Nouns—30:—bath, beard, Bess, Blanche, bucket, cow, darner, door, drawers, face, Gallaway, girl, glasses, gown, kitty, lap, mama, nail, neck, needle, "nighty," pillow, proboscis, school, shirt, soap, stove, train, trees, window.

Verbs—7:—don't, get, kiss, read, tickle, tuck, visit.

Adjectives—3:—cold, greasy, naughty.

Adverbs—1:—through.

Twentieth Month

Nouns—68:—acorn, Addie, apron, ashes, back, beads, birds, block, brow, cheek, church, clothes, coat, collar, cornflakes, cover, cuffs, dishes, dust, feet, finger, flag, hammer, heel, hole, honk honk, jelly, key, knee, leg, letter, lip, mill, mirror, money, music, nap, napkin, necklace, piece, pitcher, potato, powder, rag, rice, robe, rock, Ruth, shoulder, shovel, skirt, smoke, somebody, sore, string, tail, thimble, thread, tie, toe, towel, town, trousers, trunk, tub, wagon, water, wood.

Verbs—26:—bark, blow, break, broke, build, button, cut, fasten, fix, fly, ironing, mail, open, pinch, play, pull, raining, run, scrape, sew, sharpen, sing, sleeping, spill, swing, wash.

Adjectives—6:—cool, nice, one, other, wet, windy.

Interjections—1:—boo.

Twenty-first Month

Nouns—67:—arm, belt, Bennie, "bile," bobbin, "booggar," bridge, buckle, chain, chamber, children, crumbs, dirt, dollar, elbow, Elizabeth, file, finger, flapper, floor, furs, George, handle, hominy, hone, ink, Kewpie, laundry, laundry-man, leaves, measure, mess, muff, nabisco, name, navel, noggin, nuts, pan, pen, pillowcase, plenty, poker, porch, postman, quilt, razor, rompers, room, rubber, sash, saucer, seed, sheet, something, stamps, stomach, sunshine, supper, table, tennis-racket, toast, vase, waist, watch, whistle, wrist.

Verbs—16:—fall, fit, hide, hug, knock, shake, shut, sit, smell, sneeze, spit, stand, sweep, tie, walk, write.

Adjectives—7:—heavy, muddy, red, rough, sticky, tight, well.

Twenty-second Month

Nouns—81:—Auntie, Bible, bite, bracelet, cake, card, carpet, charm, clock, come, corn, corner, counterpane, custard, dimple, dining-room, dresser, drum, Effie, enough, eye-shade, father, garter, good-night, Grant, grocery man, hairpin, hen, high-chair, hip, house, Jim, kimono, kindling, knuckle, lashes, lather, machine, map, miss, molasses, Mrs., Muffin, orange, overcoat, patch, peeling, peep-eye, penny, picture, plate, prunes, rabbit, reading, ring, rocking-chair, rubbers, rug, Rush, salt, shadow, shoebuttoner, side, sleeves, snow, soup, stick, stopper, sugar, tangles, tie, toilet-room, tooth-pick, trash, tune, vest, walk, wall, window-shade, words, wrap.

Verbs—54:—bite, bump, carry, catch, choke, clean, coming, combing, cook, cough, crochet, cry, drink, drinking, drop, fell, find, fold, got, hand, hang, have, hear, help, hold, hurt, jump, kick, love, make, mash, move, pat, pick, reach, ride, riding, rock, roll, running, scratch, shave, spank, stop, study, take, undone, walking, warm, wear, wink, wipe, wrap, you're.

Adjectives—14:—bad, busy, "comfy," full, hard, last, poor, ready, sick, sleepy, smooth, sweet, tired, welcome.

Adverbs—10:—away, back, here, in, out, over, so, soon, there, too.

Interjections—2:—oh, 'scat.

Twenty-third Month

Nouns—76:—Adeline, Arkansas, basket, bit, blanket, blotter, closet, clown, cushion, Davis, drawer, finger-nail, fire, fire-place, fountain-pen, garden, good-bye, ground, hello, hook, Indian, iron, James, Jane, jaw, jello-book, kiss, kitchen, letter-box, light-shade, love-bite, ma'am, man, mattress, McCoy, mole, nest, Nora, petticoat, piano, place, pocket-book, purse, racket, rib, sack, scraps, seat, ship, shredded-wheat, sir, skin, song-book, splinter, sponge, springs, stockings, stove-pipe, strop, street, stump, sun, Susie, sweater, swing, table-cloth, tablet, temple, thimble, time, tongue, vein, wash-stand, way, wood-box, zwieback.

Verbs—81:—aren't, believe, bless, blue, bounce, brush, burn, call, chew, climb, close, comb, cover, crack, cross, crying, dance, darning, doing, emptied, feed, found, flew, freeze, grunt, had, heard, hid, "holler," hop, hushed, iron, is, keep, kneel, let, lift, like, look, lose, making, mark, meet, paddle, 'phone, pinning, pump, punch, push, put, rest, rub, ruined, see, set, sewing, singing, slide, spark, speak, sprinkle, squeeze, stay, straighten, stretch, swallow, sweeping, thread, throw, tore, torn, touch, treat, turn, unpin, wait, wake, watch, went, whistle, work.

Adjectives—27:—a, afraid, all, another, awake, better, big, brown, busy, careful, close, closer, drunk, front, high, little, loose, much, new, right, some, sore, still, the, three, white, wrong.

Adverbs—10:—again, around, awhile, better, directly, inside, once, round, where, yonder.

Pronouns—5:—her, I, them, they, what.

Prepositions—6:—after, by, in, on, to, under.

Conjunctions—1:—and.

Twenty-fourth Month

Nouns—66:—Andrew, aunt, Belle, blubber, breeches, candy, Central, chalk, Connor, cornbread, curler, dolly, Dolph, dose, Easter bonnet, Elbert, everybody, Fanny, Fayetteville, flipper, folk, Gibson, glass-case, hall, Hattie, hog, hold, Jack, jam, Jewell, kitty-cat, Lambert, lid, Lillie, Lois, Mabel, mammy, mantel, Margaret, Mary, Monticello, necktie, number, pig, preserves, rattle-box, ribbon, Robert, rocking-bed, rooster, rope, scar, Scott, shell, slipper, speck, stool, strap, suit-case, tears, thunder, tobacco, uncle, Wallace, Wella, wheel.

Verbs—37:—barking, bring, burned, can't, crook, dress, fixed, gave, give, grinding, has, hunting, killed, laugh, lay, leave, looking, might, needs, part, playing, plow, poke, pour, powder, prop, rake, reading, rinse, save, saw, start, think, told, turning, unfasten, winding.

Adjectives—11:—an, barefoot, beautiful "bitty," blue, dark, fresh, meddlesome, middle, sorry, two.

Adverbs—2:—about, nearly.

Pronouns—1:—herself.

Prepositions—4:—at, behind, of, with.

Twenty-fifth Month

Nouns—37:—Alcorn, bananas, beans, bowl, buttonhole, candle, coat-hanger, cold, Emma, end, Evans, fork, grandma, grandpa, greens, ironing-board, John, lace, manicure scissors, marble, meal, meat, night-gown, onions, parasol, pat, rest, safe, sleep, slop-jar, Stella, strawberries, syrup, Thomas, Virginia, whip, worm.

Verbs—42:—be, bother, broken, cackling, came, climbing, could, count, did, didn't, drank, feels, finish, fixing, getting, going, hammering, jumped, knocked, know, lean, moved, must, pecking, picking, pounce, said, says, shaving, shoo, stir, talking, tangled, undo, undoing, unthreaded, was, washing, will, wind, wiping, won't.

Adjectives—18:—bare-footed, both, damp, fine, first, five, four, itchy, lazy, old, own, sick, six, soft, that, tiny, too, worse.
Adverbs—4:—across, just, more, quite.
Pronouns—4:—me, my, that, us.
Prepositions—2:—against, over.
Interjections—2:—bang, whoopee.

Twenty-sixth Month

Nouns—103:—air, afternoon, Austin, back side, bags, band, bicycle, blackberries, blessing, board, bones, bonnet, bottom, bottomside, breast, breeze, bug, cabinet, car, "catty," Cavaness, chicken-broth, Collins, color, commode, core, corset, couch, course, crack, crust, cuff-button, curtain, curtain-rod, day-light, dent, dime, door-knob, doughnut, dust-pan, envelopes, fireless cooker, flapper, flour, grass, hulls, ice, kind, knee-cap, lavatory, lemonade, lettuce, Loraine, love-pat, mail, meat-saw, mint, morning, mosquito, mud, mumps, nail-brush, news, nothing, oats, paddle, part, pattern, peas, petals, pie, plug, pretty, quarter, rake, register, roses, rubber-hose, scratch, shade, shave, shuttle, sink, skirt-box, spout, step, "suit-bag," swatter, switches, tack, things, throat, ticket, tick tock, tie-holder, tinfoil, tooth-paste, top, trimming, weeds, Wilson, woman, yard.
Verbs—97:—act, acted, am, being, belong, bend, bent, bit, bleed, brought, can, combed, cool, couldn't, crowing, dig, does, dressed, dropped, dry, eating, excuse, falling, fan, fastened, follow, guess, hasn't, hiding, holding, hopping, hurry, intend, isn't, kissed, knocking, knot, laughing, left, letting, listen, made, mashing, mean, measure, mind, ought, passed, patting, peel, peeped, plant, popped, pulled, quit, rang, reckon, ringing, scare, scared, seems, sent, show, slam, slammed, sleep, snoring, spilled, splash, spoil, standing, step, sticking, studying, stump, stumped, swat, taking, tangle, throwing, ticking, tickling, use, visiting, waiting, waking, warming, washed, wasn't, waste, watching, wet, wiped, whip, would, wouldn't, yawn.
Adjectives—34:—alone, any, asleep, baked, "barefeeted," bareheaded, bucking, crusty, darling, dead, dry, easy, fat, fatty, glad, great, green, late, long, muddy, next, none, open, pink, precious, quick, sharp, short, straight, such, sunny, thirsty, this, ugly.
Adverbs—10:—downstairs, far, maybe, never, not, overboard, pretty, rather, then, upstairs.
Pronouns—12:—he, hers, him, mine, she, themselves, this, who, whose, your, yours, yourself.
Prepositions—5:—around, between, for, like, till.
Conjunctions—3:—as, but, when.

Growth

Stages of Growth

(a) It is difficult to divide the acquiring of a vocabulary into different stages of growth. At best we can only name the stages according to the dominant characteristic of each. During the first few months E had plenty of voice, but no vocabulary. She had many impressions, and each impression was followed by an expression, mostly reflex. A pain often caused her to cry out. The cries of a child are prerequisite to speech, but there is a general agreement that the earliest cries of a child have no language significance. The cause of

these cries is a disputed question. "Preyer, Perez, Moore, Trettien, Sully, and others agree that a child's first cry is one of pain rather than 'of indignation and wrath' (Kant), or it may be 'a lament over the sin and misery of this world.'" But Preyer, Shinn, and Genzmer contend that a newborn child is insensible to external stimuli.

(b) E's cries soon grew to have a meaning to her. In spite of Hume's contention that we don't know the cause for anything, E soon learned that certain cries brought her attention. Her cry for food was different from her cry caused by pain or desire for company.

(c) E began early to show by gesture her likes and dislikes. Motioning for someone to go away, take the food away, etc., appeared before any effort to express herself through words. Gesturing is still important with her.

(d) When E was only six months old she would chatter so much, saying *ma, ma,* and *da, da,* so plainly that her parents did not have to stretch their imaginations or consciences very much to think that she was beginning to talk. But six months and more were yet to pass before these syllables carried any meaning with them.

(e) Imitation will be taken up more in detail under *Method of growth.* This stage, like gesturing, is still prominent.

(f) From the age of twelve months to nineteen months E spoke single words only, with the exception of "thank you," "go on," "come on," "get up," etc., which were as one word to her. At the age of nineteen months she looked at her doll's head and said, "head broke." She had previously said "broke," which meant as much to her as if she had said, "My doll's head is broken." E had learned about 160 "word-sentences" before she began putting them together. Now she seldom expresses herself with one word only.

(g) The I-feeling stage, if a stage at all, came a little late. E was in her twenty-fourth month before she ever used "I" intelligently. When the meaning of the pronoun came to her, she really got pleasure in repeating time and time again, "I eat, baby eat, Elizabeth eat." Ross says in his *Social Psychology,* "Self and Society are twinborn." E probably sees others as *not I,* or *I* as *not-others,* but she has not yet learned to use *we,* though she has used *us* and *our.*

Methods of Growth

(a) Imitation.—Everyone who has written on the growth of language emphasizes the power of imitation. Preyer says: "It is without doubt the first and most important factor in

the learning of language by the individual." "Learning the mother tongue is essentially a kind of imitation."—Sully (49). "The larger part of the process depends on those about him rather than on the child himself."—Wundt (52). It is difficult to say at what age E began to imitate, but not until she had made sounds and movements similar to those imitated. By the time she was fifteen months old she would try to say any short word that her parents said or to make any simple movement that they made. Once after she had tried to say a half dozen simple words as fast as she heard them spoken, the word *Nebuchadnezzar* was spoken. At this E made no visible attempt at imitation, with a possible exception of a slight movement of the lips. This, with other similar experiments, made it clear that E imitated no sounds or movements until she had practiced on them,—this practice, of course, coming through reflex, spontaneous, or emotional movements. This is also shown by the fact that the new words which she uses grow longer and more complex, with but few exceptions, from month to month. Taking the length of nouns only, the average word for the twelfth month contains 3.5 letters; thirteenth month, 4 letters; fourteenth month, 4.25 letters; fifteenth month, 5 letters; sixteenth month, 4.6 letters; seventeenth month, 5.5 letters; eighteenth month, 5.4 letters; nineteenth month, 5.2 letters; twentieth month, 5 letters; twenty-first month, 5.7 letters; twenty-second month, 5.9 letters; twenty-third month, 6.1 letters; twenty-fourth month, 6.1 letters; twenty-fifth month, 6.2 letters; twenty-sixth month, 6.2 letters.

At present E's muscular co-ordinations are such that she tries to imitate almost every word that she hears. She also tries to hold the scissors as her mother holds them, hold a book as her parents do, or imitate any other action in which she may be interested. At the age of twenty-one months she tipped her hat and said "how do you do."

(b) Auto-suggestion.—Besides imitating others, E often makes sounds that she repeats time and time again. This is called by some *auto-suggestion;* by Baldwin, *circular reaction.* The first expressions were usually emotional, spontaneous, or reflex. The pleasure afforded by these new sounds caused them to be repeated for no other purpose apparently except to experience the peculiar sensation again; *e. g.,* a certain note would be struck and continued. She would get her voice keyed high and go over and over certain inexplainable sounds.

(c) Contrast of ideas.—By this is meant placing one idea over against another. As soon as E began to talk in sentences she would say, "Baby has a hand, Mother has a hand."

"Baby walk, Father walk." "Mother sew dress, baby sew scraps." After she learned that her name was Elizabeth Grant she repeated it several times and then looked at her father and said, "Father Grant." This contrasting of ideas seemed to cause E to talk when she would say nothing about one idea alone. No one tried to teach her this mode of comparison. It is a habit that is still with her and probably makes her more observing.

(d) Inflecting words.—Another method that E uses freely is inflecting words of her own accord. After she learned several verb forms ending in *-ing,* she began to inflect others; *e. g., warming, running, reading,* and others were used by E before, so far as we knew, she had ever heard them. Similarly, she used the past tense of *see, go,* and others, as *seed, goed,* etc. It may be true that children would use correct language if they always heard it, but there will be a short period in which they use many words incorrectly. E has already passed this period for many of the words. Her parents are careful to repeat the words after her only in the correct form.

Meaning of Words

The meaning of most words in E's vocabulary is continually changing. The world is just as big for one as he can see it. E sees it smaller than her 1,201 words would indicate. Not many of them, if any, have the meaning to her that they have to adults. (a) Meaning independent of picture.—For three months the word *boy* was used by E for any person,—boy, girl, man, or woman,—showing that she could have had no picture in mind. That she had a fair conception of *dog* was not questioned until a few days ago, when she called a goose a *dog.* It is difficult to know what is in her mind when she says, "The dog is barking," but evidently she has no picture of the dog. Many examples equally striking could be given to show that E has no picture corresponding to words that she has used for months. She must have images of many familiar things, but these images did not aid her in getting the meaning. The meaning came before the image. She knows several of the spectral colors when seen together, but she knows very few of them separately. The same is true of coins. In a few cases, after images have been formed they prove to be a great hindrance to a fuller meaning; *e. g.,* E has learned to associate the word *dirty* with most black objects. She now thinks that blackberries are dirty. She said, "No, I want some clean berries." The word *here* for some time meant a certain room; *back side* still means a certain part of the bed.

In general, words mean enough to E so that she gets the thought from a great deal of the "fireside conversation." Her parents, to keep her from understanding, often spell words. This E resents in no uncertain terms. She is fond of simple stories and will sit almost breathless for five minutes or more while one is being told. She will then say, "Tell baby another story." One wonders at what meaning she is getting, but not at whether she is interested. Once after her mother had told her a story E said: "Baby can tell a story. A little girl was passing in the trees. A little boy was passing in the trees. A honk honk came along and ran over the little boy."

(b) Color concept.—E knows red, blue, black, and white, when presented together or separately. She knows pink, brown, and yellow at times, but often gets them mixed, especially when seen alone.

(c) Number concept.—E can count to six, but her number concept is poor. Recently, in counting three or four objects, she counted to six. At present she knows two and probably three. E very often asks, "Where is the other one?" or says, "I have both of them."

(d) Money concept.—E knows many of the coins, especially when a number of pieces are presented at once. She has no idea of their value, however. She enjoys playing with them, but does not know that one buys things with them.

(e) Coined words.—E's experience shows that a child would make its own vocabulary. It is difficult to say just what would be left if imitation of others were taken from her, but she made at least one word to express her own idea. She was thirsty and knew what she needed. She let us know by signs and gestures at first, but this was not sufficient. E began to say "ogy." She had said it many times before we learned that it meant, "Give me a drink of water." Pelsma's child used "I" for water and "uppeday" for up. Mateer (23) tells of a child that "used about thirty, or 3 per cent, coined words."

(f) "Made over" words.—E uses a number of "made over" words and phrases, such as *too bigger, too dampy, barefeeted, too sun, salter, too much big, catty,* etc. After she had learned "lavatory" she called the bath-tub *bathtory.* "Knee-cap" was called *knee-cover.* She often says "Make it bell," meaning "Ring the bell." She learned to kill flies with a fly-swatter. After seeing a little girl hit her ball with a tennis-racket, E wanted to "kill" the ball with the fly-swatter.

Problems Involving Habit

(a) Co-ordinations.—E's earliest sounds and movements had no meaning. The movement with her comes before the meaning; *e. g.*, she learned to say "thank you," "you are welcome," "bye, bye," etc., before she knew the meaning. Though she says these at the proper time, the meaning is still very vague. Important as these co-ordinations are, they must wait and let continued use give them a meaning.

E has a habit of saying, "Let me see it just one time." She has no trouble at all in saying this, yet it has no meaning to her except that it is a more emphatic way of saying, "I want to see that." Some day the true meaning must modify this muscular co-ordination. E learned the words *hide* and *card*, and later when she began to learn *high* and *car* she could not stop with "hi" and "car," but always sounded the *d*. It was with great effort that she got her organs of speech to stop in the middle of an act. After learning the name *Gallaway*, E tried to say *Gelbard*. She would try to say it often, but it would always result in "Gallaway." She knew she had said the wrong thing, but it seemed that the first syllable was a part of a movement that had to be followed by the remainder. She finally succeeded in saying "Gallaway-bard." With some effort she now says either word.

(b) Interchange of words and parts of words.—E often has trouble with such words as *butterfly*, *hand-bag*, etc. She still says "fly-butter" as often as *butterfly*. *Hand-bag* is "suit-bag." At twenty-four months of age she called manicure scissors "toe-nails," because her mother had used these scissors for trimming E's toe-nails. Later she called them "baby-cure" scissors, after having been told the correct name. A few days afterward she was heard to call them "cure a baby" scissors.

(c) The use of *No* and *Yes*.—For some cause E answers intelligently with *no*, but nearly always repeats the question for affirmative answers; *e. g.*, "Do you want some milk?" "I want some milk."

(d) First impression hard to overcome.—E learned a watch-chain with its charm as "chain." Later she was told that a certain part of it was the charm. She could hardly forget the idea that "chain" included the charm. She learned the word *chain* after hearing it spoken twice. She was told what "charm" was at least fifty times during a period of three weeks before she learned it.

Conclusion

The study of this vocabulary has been suggestive in many ways. It makes one appreciate more the plane upon which the child lives, the size of its world, and how its world grows. So many little details have suggested themselves that it has been difficult to select the ones most worthy of a place in such an article. It has been the writer's aim to leave out all data that do not help one to see better the child's mental processes.

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ADLER'S THEORY OF *MINDERWERTIGKEIT*

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For applied psychology and education nothing is of greater importance than studies which reveal, even though to small degree, the motivations of conduct, and which thus enable the teacher, employer, parent, or whoever has to deal with the individual in question, to foresee and to guide conduct. Among the investigations in this direction those of Adler, though defective in certain respects, should have a noteworthy place. Adler began as a pupil of Freud, and worked at first with neurotic adults, but has gradually become antagonistic to Freud's own standpoint and has extended his studies, with the aid of his own pupils, to neurotic and normal children. He believes that psychoanalysis can be made of great value in child study because it tries to reach the unity of the psychic life, to work over the psychic content, and reform it when that is needed. All psychoanalysis begins with the belief that the fulfilment of wishes is the dominant thing in psychic life, and that the character and development of these wishes constitute the elements and the growth of personality. Every psychic process receives a new evaluation from this point of view.

One of the first discoveries made by psychoanalysis was that memories which had apparently dropped out of consciousness, exercised a strong affective power below its threshold, and we need not be reminded of the importance which Freud has attached to the proper revival of these in order to free the patient from their power. Here we wish only to emphasize the fact which Adler has emphasized, that what is thus retained is retained because it is desired again; that is, the essence of remembering is wishing, associations are purposive, and no individual lives in his past except as he would fain make it his present and future. This means, however, that the past is not itself the end, but only the means, the material, which the self works over more or less to suit its life-plan.

In speaking thus of memory, wishes and the like, we must keep in mind that no psychoanalyst limits these terms to consciousness. They believe that what is gained by deliberate observation of the self, by voluntary recall, is relatively a superficial part, the part which has never acquired strong

feeling tone, and which has had relatively little significance for the personality. As soon as any mental event is tinged with pleasure or pain, especially pain, mechanisms of transformation or of repression are started which so modify the form and the functioning of the original experience that it becomes unrecognizable in most cases, and most of all to the person most concerned. As far as my knowledge goes, psychoanalysts have not followed out these mechanisms for pleasure-tinged processes to any great extent, but they seem to have proved their case to large degree for the pain-tinged. Now, in the case of the painful psychic process it is a measure of self-protection, sometimes even of preservation of the personality, to turn attention and in the worse cases consciousness itself entirely away from it, and this means that to greater or less degree it descends into the subconscious or the unconscious. These two parts of the personality deal with it in their own way, and allow only those forms of expression which are tolerable to consciousness. Naturally, such expressions are very different in form and apparently in content from the original painful experience, but psychoanalysts believe that there are constant relations between the two, laws of transformation, repression, etc., such that the one who knows these laws can from observing the involuntary manifestations conclude correctly to the original cause.

These repressive tendencies appear most plainly in the person of neurotic disposition, but they are to be found in every one to greater or less degree, as is also the complex.[1] But while the normal person rarely represses pains to such an extent that they fall out of conscious control the neurotic takes to oblivion more easily. Again, even if the normal person does lose voluntary recall of a painful experience, its involuntary manifestations may run their course for a time and gradually disappear without breaking down the health, either physical or psychical, while in the neurotic the repression seems to stimulate growth. That is, if we may speak figuratively, the normal person exposed to pain and sorrow develops psychical anti-toxins which are sufficient in most cases to preserve him from psychical death or permanent lesions; but the neurotic lacks the power to form these anti-toxins, and the invading bacteria attack all parts of his psychic structure and may leave lesions in any part.

But what parts are most likely to be attacked? Naturally, those that are weakest, and here begins Adler's theory. In

[1] The term "complex" is used in general to indicate a strongly affective memory which is usually painful, and with which other ideas may become associated, the whole group of associated ideas and feelings forming a constellation.

his original study in 1907, *Ueber Minderwertigkeit von Organen,* he starts with this very illustration of bacterial disease. The weak spot, the one open to the attacks of disease, is, he believes, usually if not always an inferior organ. Such an inferiority may manifest itself either in the structure or the function of the organ, though usually both are involved. Not infrequently also, the organ can be called weak only in a relative sense, that is, it is so nearly normal that only some unusual strain shows that it yields to disease or fatigue sooner than other organs.

The weakness of an organ may appear either in its structure or its function. In the beginning, the individual of course knows nothing about an inferior structure, unless it is very serious or is in an external organ. In most cases he only knows that it is hard for him to meet the demands of life in this or that respect, but he does not think of seeking the cause for his difficulties in some organ.

Functional inferiority, again, shows in the unsatisfactory amount or quality of the work of an organ in response to the demand upon it. The attempt to make good this imperfect functioning, the compensation for it, may show in a variety of ways. (1) If the organ is one of a pair, its symmetrical organ is altogether likely to take up its work. In some cases the inferior organ then ceases to work and atrophies while its mate hypertrophies, or becomes diseased from overwork. In some cases, however, there is no such compensation.

(2) In other cases again, another organ may take up the work of the defective part. Thus an inferior kidney may be compensated for in the stomach, or in the circulation, all the excretory processes perhaps becoming modified to some degree. Sometimes the organ will belong to the same general system as the inferior one, sometimes not. The brain frequently compensates for a defective functioning. Sometimes the organ which compensates becomes itself diseased, controls all the symptoms of the patient and makes correct diagnosis well-nigh impossible. *E. g.,* there may be consecutive diseases of the heart, skin, eye and digestive tract in attempts to compensate for a weak kidney.

(3) Or again, the organ may work out its own salvation by its own excessive functioning. Which of these courses will be followed depends upon the reserves of power in the different parts of the body, and thus we may get almost any modification of function, secretion, or growth. In general, however, Adler believes that the more nearly normal an organ

is the more it compensates by hyper-function; the weaker it is the more it compensates by hypertrophy.

Inferiority of an organ, whether structural or functional, especially if it is slight, does not mean an early death or even a breakdown. Compensation for slight defects may go on unconsciously and only manifests itself to the psychoanalyst in nervousness. Nevertheless, it is highly important for the happiness and success of the individual to discover such weak spots, and the physician as well as the teacher has indications of great value here. First come indications from heredity. As Adler states it, we all inherit one or many inferior organs, but this defect may appear in different parts of one system so that children and parents may vary greatly in their ability to meet the demands of life. Epilepsy, *e. g.*, indicates that some part of the brain is defective. The various equivalents of the attack are, in his opinion, attempts at compensation, and include such widely different things as the work of epileptic geniuses, criminals and alcoholics. Again, diabetes is not inherited, but an inferior digestive tract is. Probably cancer never develops save in an inferior organ. That is, if there is a known defect in the parents, defect should be sought in the child in the same system of organs or else in some compensation by the central nervous system, which will be considered presently.

Secondly, memory is of great aid in diagnosis. Inferiorities are very likely to be more manifest in childhood than later, and the recall of these either by the patient or by members of his family frequently gives valuable hints for diagnosis. Stuttering, blinking, vomiting, and many other slight defects are all significant, while on the side of compensation, unusual facility in speech, artistic appreciation of form and color, etc., are also.

On the side of structure, the ordinary stigmata are the most obvious indications for the physician. These are due to some defect in the embryonic nourishment of that organ, and may of course be of almost any degree. Thus the stigma, like a misshapen external ear, may be the only part defective; or it may point to a serious defect in the internal ear; or sometimes the internal ear may be defective while the external is perfect. Similarly with the eye, such anomalies as very narrow lids, short and long sight, strabismus, etc., may indicate inferiority in the organ which will predispose to disease. Anomalies of the mouth, teeth, gums and tonsils are closely related to inferiorities of the respiratory tract as well as of the digestive tract. To the careful physician they are sign posts. They point to the parts that should be more carefully examined. In some cases—perhaps one might say in many

cases—the defects are so slight that they seem to involve no bad practical results, but in other cases they may be the direct cause of nervous breakdown and failure in life.

It is rare to find only one inferiority, for even if at first only one organ is inferior, its poor functioning inevitably involves those associated with it, and sooner or later it is sure to involve the reproductive system. Rarely is there any disease, Adler thinks, without some disturbance of the sex functions.

We have to note, finally, that since the inferiority of an organ is embryonic in origin, such organs seem especially to retain certain other qualities of embryonic tissue, viz., great variability, power of growth, and power of compensation. These guarantee adaptability of the organ and form the *organic* basis for the theory of compensation. So far therefore, Adler summarizes his theory in essentially these words: In the struggle for existence the adaptation to altered life conditions is not carried on by the survival of those which are accidentally *stronger,* but by means of the greater variability and tendency to growth of *inferior* organs. This is the kernel of the physiological part of his theory, and if it should prove generally true, it would be a very important modification of the evolutionary theory. It is, I believe, generally admitted to-day that any embryonic tissue which, for one cause or another, survives in the child or adult, does retain the possibility of unusually rapid growth, and if stimulated will grow, as *e. g.,* cancer does. Experimental embryology seems also to have demonstrated that almost any modification of a given organ may be produced if its stimuli (including here its food) are suitably modified. It would be, however, something of a leap from the variability and power of growth of an organ during the embryonic period, to conclude that any organ which has not developed then, will later in childhood follow that curve under the influence of any external stimuli. Adler himself does not, however, bring out this point much. He tells us that if an organ is very inferior it tends to compensate by over-growth, but for the most part he is concerned with those inferiorities in which one organ compensates for another, or in which the organ itself compensates by over-functioning. The last case is the one with which he is concerned as a psycho-pathologist, and which also has the most significance for psychology and education. Let us consider this therefore in more detail.

Suppose we have some organ which is rather weak, say a short-sighted eye. The child adapts with difficulty to any situation demanding clear vision, and in the effort to get clear vision he is likely to use his eyes more, and perhaps use them

even to the point of pain. In the endeavor to see he gets a great deal more feeling, especially of a painful quality, than the child with a normal eye does, and the visual brain centers which are concerned with receiving and associating the visual stimuli, are roused to unusual activity and become more developed. Thus a nervous superstructure is built up in connection with this slightly defective organ by means of which the organ compensates for its own inferiority, and may not only compensate for it but even reach unusual attainment. On the psychical side this greater nervous functioning is accompanied by greater sensitiveness to all visual stimuli, greater attention to them, a better memory for these things attended to, and thus a greater ability to visualize and to develop imagination along visual lines. The sense of inferiority (*Minderwertigkeit*) and inability to meet the demands of life is very painful to the child, and tends to rouse the opposite impulse of aggressiveness, self-assertiveness, or the will to be superior.

To support this general standpoint, Adler brings forward numerous illustrations. He cites one family in which three children suffered from defects of the ear, while the other two showed unusual musical ability. That is, in the two musical children the defects were of such a sort that they could be compensated for in this way. He believes that speakers and singers are likely to have some anomalies of the mouth or nose, and cites Moses and Demosthenes. Beethoven and Clara Schumann are instances of musicians with ear defects. Studies of the students in certain art schools disclosed the fact that 70% had eye anomalies of some kind. And thus he goes so far as to say that defectiveness in an organ opens a sure path to knowledge, understanding and foresight, inasmuch as it makes the individual clearly conscious of the dangers threatening him and sets him to devising the most effective way of overcoming these dangers.

To follow the windings and twistings of the mind in its attempts at compensation is one of the most fascinating studies, though inevitably very incomplete at present. The feeling of inferiority is naturally stronger with children than with adults, because they are small and weak and inexperienced and must compare themselves with father and mother to their own disadvantage. The stronger the feeling, the greater the attempt to compensate as a rule, and to get standards or measures with which to compare oneself. This leads to laying down guiding lines, or setting ideals, or positing ends or purposes which the child believes he can attain. He has a special interest in protecting his weak organ, and covering up its defects from others, or in strengthening it to meet the

demands put upon it. All his powers become tensed; he is more or less anxious, distrustful of self and suspicious of others. He is usually jealous, and may become cruel. He is likely to become disobedient and defiant, unless his sense of inferiority is so great that he seeks satisfaction in external submission with greatly heightened inner tension and rebellion. All this appears to some degree with the normal child who is made to feel inferior, but with the neurotic child it is greatly exaggerated. In him the inner need of respect, assurance, and so on, is transformed into an ideal of self whose realization he demands but can not attain, and yet can not determine to give up. Hence follows a long train of anxieties, humiliations, disillusionments, etc., ending usually in complete nervous breakdown and often in failure in all the life plans. The normal person, however, adapts and makes over his ideal, and changes his guiding lines according to conditions. Assuming that an impulse is a summation of the activity of a given organ with its nervous superstructure, it is evident that its development through life depends on the one side upon the demands of the external world, and, on the other, upon the satisfaction of the needs of the organ. This gives the problem of the adjustment of inner and outer demands. Whatever reaches consciousness from these impulses as well as what is evident to others merely from involuntary betrayals (*Misverstehen,—sprechen,—handeln,* etc.), may be derived from one impulse or from a combination of many; may have gone through cultural refinements, transformations, etc., and broadened out in numerous directions; or may have been checked in range, or entirely inhibited. In the case of inhibition or repression into the subconscious, the corresponding conscious phenomena are very characteristic:

1. The impulse may pass over into its opposite. Thus a person with miserly tendencies which have become intolerable to him through their painful results, represses this tendency severely and allows himself to be conscious only of his generosity.

2. The impulse may take another end or goal or object. A forbidden love, *e. g.*, still persistent in the subconscious may appear in the conscious as love of religion or a cause or principle or art.

3. The impulse may be turned upon the self. This seems to be the road to illusions, hallucinations and insanity, as well as to other morbidities. The aggressive impulse repressed may become a delusion of greatness or of persecution; a strong wish or desire may become a presentiment or hallucination, etc.

4. The energy of the impulse may be transferred to another strong impulse. It is difficult to see why this is not covered by 1. and 2. though Adler makes it a separate head. The illustration he uses is that repression of the sex impulse may so heighten the impulse to look that sex symbolism is seen in every object; or at the opposite extreme, all sight is obscured and mental blindness results.

The strength of the impulses seeking satisfaction as opposed to the repressions brought to bear by society, culture and the environment in general, gives us therefore a highly complex resultant which we can hardly expect to outline in more than the roughest way.

Even on the first day, in the first cry, Adler believes that the child's attitude is properly described as hostile, and this hostility rises from the difficulty his organism has in getting pleasure. As soon and as long as any organ fails of satisfaction, an excitation or stimulation streams into the nervous superstructure and the impulse becomes greater and more conscious. An inferior organ, therefore, which is never well adjusted to external demands and rarely reaches satisfaction, will have a stronger impulse than a normal, and aggressive tendencies are more likely to be related to it than to other organs.

Adler seems to consider the voluntary muscular system the especial organ of the aggressive impulse, which is subject to the same kinds of repression and transformation as the others. In its uninhibited form it is striking, biting, cruelty, etc. In more limited phases, it is sports, duels, war, and religious, social and racial struggles in all forms. Turned upon self it becomes humility, flagellantism, masochism, etc., with its extreme in suicide. With its object changed and approved by society, it follows such professions as judge, teacher, preacher, surgeon, butcher, and so on. The fearful and awful creations of art and literature are its children. When, finally, the repressed aggression turns to the opposite in consciousness, we get pity, tenderness and altruism.

Here we must note that the defects with which Adler is especially concerned are slight. If they are serious enough so that they are evident to those in charge of the child, he is put under the physician's care, or if though serious they are obscure, he is not able to adapt at all and breaks down completely. When they are slight enough to cause tension but not to prevent compensation, then we get the cases in hand. On the side of feeling, there is a sense of uncertainty, a lack of self-assurance, which leads to vivid imagining of what is desired as well as of the chance of failure; a constant comparison of self with others, and thus jealousy, deprecia-

tion of others and egotism and conceit. The child wishes to be first, but fears the judgment of others and is glad to postpone decisions. In the moral realm, he may be over-scrupulous, painfully truthful, modest to prudishness, and so on, both in order to feel his own superiority and to be able to criticize others. If he sees failure ahead, he is likely to increase in aggressiveness. He does not admit defect in himself but attributes his failure to the illwill of others, to sickness or misfortune not under his own control, to bad inheritance, and so on. Even the admission of defeat is hard and yet he betrays his sense of defeat in many involuntary ways. Often an attack of sickness is the completest confession, as well as a method of getting the attention so necessary to his mental peace. Thus a certain type of neurotic man and woman control through their weakness when they find it impossible to conquer through their strength.

All this is most suggestive and tends to make one believe in the general theory of compensation for the sense of inferiority. It helps one not at all however in tracing the guiding lines, for the characteristic attempts just described may rise as the result of feeling inferior, whatever the cause of this feeling, whether organic or social, justified or not. Here, indeed, in trying to work out the chief guiding lines, one finds what seems to me the chief weakness of the theory in its present form. We have already noted that Adler tells us that the particular form which the compensation takes depends upon the reserve powers of the individual. It may come through a symmetrical organ, or any other organ, or through building up the nervous superstructure of the organ itself. But if we take the case where the nervous superstructure is built up, we enter at once into a field where two large classes of complications occur, viz., the psychical and the social or cultural. It is not sufficient to say that the child with a weak eye will cultivate the visual part of his brain and his psyche. He may or he may not. That seems to depend largely upon the social and especially the family environment. Granted that the little child has a feeling of insecurity originating in some inferior organ, and that he has an aggressive impulse to overcome, to rid himself of this unpleasant feeling, the particular line or direction which he will follow in order to attain this end may vary as infinitely as do personalities themselves and their relations to their social environment.

In the ordinary family life the father occupies the position of greatest power and satisfaction. He is therefore the one envied by the child, and is altogether likely to become the child's first goal. The child very early expresses this in

the wish, "I want to be a man," which, says Adler, means only, "I want to be superior, in authority, as papa is at home." So general is this condition that from infancy itself in the child's mind superiority, power, and the masculine sex are bound together, while inferiority, weakness and the feminine sex are combined on the other side. The child's ideal therefore expresses itself in the sex form, "I want to be a man," whether the child is a girl or a boy, but this does not indicate, Adler believes, that there is any sex meaning in the child's wish, either conscious or unconscious, as Freud asserts. On the contrary, it means only that in seeking a form of expression for his aggressive impulse the child naturally chooses the person in his experience who gets the greatest satisfaction, that is, his father.

This triple combination, however, of qualities which do not inherently or necessarily belong together, viz., superiority, authority or power and masculinity, has unfortunate social consequences in various directions, Adler points out. The child, with his sense of inferiority, desires the feeling of self-assurance, power, satisfaction, and forms the ideal of being like his father. But he is not his father; he is little and weak, subject to punishment, forced to obey, and so he is under more or less psychical tension all the time. Whether he relieves this tension by obedience or defiance depends on the child and the conditions. Both secure for him the attention of those about him and in so far both give him the sense of power. But sometimes defiance, even though punishment follows, may so heighten self-feeling that the child prefers it to obedience and lukewarm approval. Adler believes that all the virtues and faults of the normal boy may be resolved in the end into the subconscious wish to be a man, to be superior and powerful.

But what is true of the normal boy is also true of the normal girl, though with greater emphasis. She too wishes to be superior and powerful, and since these qualities are most in evidence in the father her ideal is likely to be the same as the boy's. But in her case the distinctions made against women and girls both in the family and in society greatly heighten her sense of inferiority. As a rule the mother is subordinated to the father in numberless ways, both large and small, while the subordinate position given to women in society need not be more than referred to. When therefore she chooses the masculine ideal, desires the same satisfactions as her father, makes the manly protest, as Adler calls it, the greater distance between the ideal and the actual makes the psychical tension considerably greater in her case than in her brother's and this, says Adler, is the reason why

there is so much more nervousness among women than among men. Consciously or subconsciously the most normal woman is under greater tension than a normal man, and will be until there is a condition of full equality both in society and the home, a complete recognition that the value of the services rendered by women is equal to that rendered by men. As long as there is this greater tension, however, resulting from the social judgment of inferiority, it is inevitable that women of strong character shall in certain respects adopt and endeavor to follow masculine ideals.

This process goes on for the most part below the child's own consciousness, and the reader of Adler is almost tempted to put it into terms of purely reflex reactions to painful and pleasurable stimuli. But to the observer the child acts as if he had reflected on the means to reach his end and did what he did deliberately and voluntarily. Even in early childhood, when the child takes a place in the family, he shows certain skills, aptitudes, and adaptations which must be referred to this constant will to power. In the neurotic child these are especially evident, so that all the child's bodily attitudes are in truth a pantomimic representation of his character. Every blush and glance, his walk and gestures, his food and other likes and dislikes, to say nothing of defects like stuttering, go back to a sense of inferiority on one side and an aggressive impulse at compensation on the other. On the more purely psychical side, the development of memory depends upon the child's striving against the dominance of present impressions. Memory throws a bridge over to the future of satisfactions, and is in its significance future, not past, for we remember what we wish to have repeated. It is interesting to note here that Stern tells us also that imagination develops earlier than *voluntary* recall, and that the first time-words refer to the future and not to the past. Imagination is but a step farther in the same direction, and thus the guiding fiction, end or ideal, takes the form of the father (or in exceptional cases the most authoritative person in the child's environment), this in turn being only a modified memory of the child's experiences with this person. So children sometimes take the mother for the ideal, or when they are somewhat farther removed from home influences, the teacher, coachman, etc., or perhaps the hero of a story. In all life, says Adler, nothing works so secretly as the establishing of this ideal of personality, and naturally, for its motivation is to limit the superiority of others by depreciating or injuring them in comparison with self and this, on account of the child's weakness, cannot be done if the outer relation seems to be disturbed. The child indulges his fiction of

superiority secretly and outwardly learns to adjust it to external demands so that if he is normal, the fiction and the environment become so adapted that his attitude is a reasonable and moral one. In this process of adjustment the atmosphere of the home is the most important factor, especially as to whether it satisfies the child's need of tenderness and love. Nothing but love, which satisfies the child's desire for self-assurance, and which starts up all his psychical apparatus and keeps him happy, can relieve the tension between the weak child and the strong parent. If it is lacking the child almost invariably focuses on himself, and becomes highly sensitive and aggressive, if not actually neurotic. And so we might consider various typical family situations which injure the child, such as excessive authority by parents who have themselves failed of power and satisfaction in their dealings with the outside world; an undesired child, who is either ignored and neglected or else, through the prick of conscience, is over-cared for without being loved; favoritism by parents toward children. Thus arise estrangement, distrust and hatefulness with the inevitable accompaniment of secrecy and silence in the presence of others, and a highly developed fancy. The child's feeling that he is bad, clumsy or stupid and will be laughed at or punished, is compensated in both his waking and sleeping dreams by an emphasis on the opposite traits.

The development of the neurotic child and person are followed out in rich detail by Adler, since they are the outcome, as a rule, of these slight organic inferiorities with the accompanying sense of insecurity. He gives numerous individual cases showing how the combination of the sense of inferiority with the aggressive impulse and desire to be above leads to all the characteristics of the "nervous" person—fanaticism for truth; excessive humility, modesty, or virtue in any form; unrealizable ambition; envy and jealousy of others, with the various forms of depreciation of them; ambition in science, art, or what not, as forms of power; undue craving for love and affection from others and excessive demands from those who love him, etc. These are the more direct ways in which the individual compensates and secures the feeling of assurance so necessary to his happiness.

But again, when the neurotic is unable to attain his end in these ways, his path becomes more devious. He may make a cult of his weakness, exaggerate his helplessness, and develop childish or invalid traits, in order to be the focus of attention and care. Or again, he may take the most directly aggressive line of all and become frankly selfish, cruel, or criminal. Which of the many lines he does actually follow

is the resultant of many factors, but probably Adler would be willing to make the general statement that the impulsion always comes from the feeling of inferiority plus the will to power, while the form of the ideal or end depends upon the conditions under which the child lives.

All this is very suggestive to the parent, teacher, and social reformer as well as to the psycho-pathologist, but to the layman it seems as if the emphasis upon organic weakness was over-great. Adler himself indicates that if the child's position in the family is such that his weakness is *not* a cause of pain or ridicule, there will be no attempt at compensation. That seems to show that the weak organ does not give rise in itself to the sense of inferiority, but that the demands made upon the child for adaptations of one kind or another do. Many a dyspeptic never attains to wealth or to scientific eminence; many a one with defective eyes or ears fails to become skilled along artistic or musical lines, as Adler himself remarks in an aside. On the other hand, there are plenty of persons who have no organ that could properly be called defective, either in structure or function, who do nevertheless feel inferiority, and compensate by attaining eminence along the line of the strongest organ, instead of the weakest. They have been put into a social environment which depreciates them, as they feel unjustly, and this rouses the aggressive impulse as a mere inferior organ never can.

That is, the question may fairly be raised by the psychologist whether it would not make Adler's theory of *Minderwertigkeit* more complete and valid if organic weakness were put as merely one of the causes which favor the sense of inferiority instead of being an invariable cause. Adler himself is unable to trace any constant relation between a given weak organ and the compensations for it, the compensation sometimes being hypertrophy of the organ, sometimes functioning of another organ, sometimes development of neuroses or psychoses, and sometimes development of talent or genius. Such a variety of possible outcomes surely argues that the organ is not the determining cause, but that the social factors are. The social reaction on the individual is the spur to better adaptation, and the guiding lines, or fictions, or ideals are shaped by this reaction. The great majority of children get enough love and consideration at home and in school so that they do not strive to escape, and they grow up quite content to be ordinary citizens as their parents were before them. There is every probability that many of them have enough mental ability to raise them to a better social and financial status if they cared enough for the progress to work harder, or if they suffered from the sting of being held in an

inferior estimate by their associates, or were put under conditions where the external pressure to do better work were great enough. Men develop greatness in response to the demands made upon them. If, therefore, the child is protected from the need of social adaptation, or if the demands are so excessive that he feels hopeless of satisfying them, he is not likely to attain eminence even if he has innate ability. Society's greatest task is to learn how to apply the right amount of social stimulation, the right proportions of praise and blame, criticism and love to keep the individual self-respectful but not conceited, happy but not lazily contented, attentive and energetic but not a sufferer from *Angst*. The great task of pedagogy is to transfer the feeling of inferiority and the aggressive impulse to ever higher intellectual and moral planes. This means to apply social stimuli on the one side and to supply the best ideals on the other, and then the mechanism of compensation so well described by Adler will have free play.

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ETIOLOGY OF SCOLIOSIS[1]

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Descriptions and Signs of Scoliosis.—The term Scoliosis is a Greek word, says Lovett (73), dating from the time of Hippocrates, meaning a bending, twisting or curving, and is used as synonymous with lateral curvature of the spine or its equivalent in other languages. In German it is termed *Skoliose* or *seitliche Rückgratsverkrümmung,* and in French is known as *Scoliose* or *déviation latérale de la taille.*

Lovett (70, p. 40) defines scoliosis as "a condition in which any series of vertebral spinous processes may show a constant deviation from the median line of the body, a deviation always accompanied by an element of twisting." Whitman (120a, p. 149) describes lateral curvature of the spine as an habitual or fixed deformity in which the spine is deviated in whole or part to one or the other side of the median line."

Again, to quote from Lovett (70, p. 44), "although scoliosis is generally studied and classified as a deformity of the spine, the laws of equilibrium of the body are such that any deviation of the vertebral column must disturb the whole balance of the body, and scoliosis is therefore accompanied by compensating lateral displacement of the pelvis and legs. In this wider sense scoliosis is to be regarded as a deformity of the whole body, especially manifested in the spine."

The characteristic sign of scoliosis is a distortion of the symmetry of the body. This may be accompanied by "a high shoulder" or "a prominent hip," etc. The condition

[1] I wish to express my sincere thanks to Dr. William H. Burnham, under whose supervision this thesis has been prepared, for suggesting the field of investigation and for his personal interest in its development; to Dr. E. G. Brackett, of Boston, and Dr. K. Emerson, of Worcester, for the loan of private materials; to many members of the medical profession, both here and abroad, for valuable books and reprints of their publications.

I wish also to thank Dr. C. E. Ehinger, State Normal School, West Chester, Pa., for the kind inspiration which led to my interest in making a study of scoliosis; Dr. E. C. McDougle, for helpful criticism and suggestions; and Dr. L. N. Wilson, for revision of bibliography.

is essentially a distortion, and other signs than the deformity are rather unusual in average cases.

Classification.—According to Lovett (70, 73) and Tubby (119, p. 406) there are two types: First—Functional, also spoken of as postural or total scoliosis, faulty attitude, or "false" scoliosis, a term used by some of the more recent German writers. Second—Structural, organic or true scoliosis. There is an intermediate or transitory type, through which a curve passes in the development from functional to structural types. I. The term "total scoliosis," Lovett (70, p. 46) states, is applied to cases where the spine forms a gradual curve to one side without marked rotation or compensatory curves. The typical characteristics of a left total curve Lovett (73) finds are as follows: (1) The spine forms a single lateral curve, in 90 per cent of the cases convex to the left; (2) the left shoulder is elevated; (3) the right side of the shoulder-girdle is carried back and the left side forward; (4) when the patient bends forward the right side of the back may be slightly higher than the left. Transitional curves: In many cases which on first inspection appear to be postural, a more careful examination will show that the curve is obviously changing from a functional to the structural type, *i. e.*, beginning to show changes of structure. In these cases some of the characteristic signs are absent. For instance, the upper part of the spine is less curved than the lower, or, the right shoulder may be elevated in a left curve. To quote from Lovett (70, p. 51), "it is not exceptional to notice in a curve that has been clearly a typical left postural one, a few months later the dorsal spine is straightened and even becoming slightly curved to the right."

II. The term structural scoliosis is applied to those cases in which there is reason to believe that a structural change has occurred in the vertebrae. The characteristic feature of structural scoliosis is the presence of a backward prominence of the chest or loin on the convex side of the lateral curve, that is, the side toward which the spine yields. Kirsch (62) states, "a sign which is fairly sure to be present in all scoliotics is the torsion of the abdomen." This he found present in all but five per cent of 1015 cases examined. Structural curves are simple and compound—simple when the deviation is accompanied by no compensating curve, compound when more than one curve is present. The simple curves are often spoken of as C curves and the double as S curves. Triple curves may exist.

All classifications to-day are based upon symptomology and are merely tentative. It is very desirable to have a classification according to the etiology. No doubt this will come and, as Schanz (96a.) says, the next great step in scoliosis is from the point of view of pathology.

Scoliosis and School Life: This subject was formerly discussed only by physicians, but to-day it is given due consideration by physicians, teachers, and the laity. It concerns the welfare of all families having children.

When we realize, says Sever (108), that at present about twenty per cent of the total population of the United States spends from three to five hours a day in school, and that this percentage is likely to be higher than lower with the increase in the extensions of the public school system, the responsibility of the proper care and supervision of this enormous number of children is great.

The United States census of 1910, shows the total number of persons of school age,—that is from six to twenty years inclusive,—was 27,750,599, of whom 17,300,202, or 62.3 per cent attended school. The period of maximum school attendance is from ten to fourteen years of age. For these years a comparison may be made with the census of 1900. In 1900, 79.8 per cent of the children attended school compared with 88.2 in 1910, showing an increase of almost ten per cent. In the group of six to fourteen years inclusive,—the most common years of school attendance,—there was a total of 16,832,374 persons reported in 1910, and of this number, 13,706,980, or 81.4 per cent, attended school.

The relation that school conditions bear to scoliosis, writes Lovett (70, p. 111), is one of the most important questions in formulating the cause of scoliosis. There has been in the past a general tendency to regard scoliosis as a deformity largely associated with school life, and a disposition to consider unhygienic school conditions as the cause of scoliosis among school children.

Sever (108) writes: "School life is to a certain extent an artificial one for the growing child, whose normal growth depends considerably on its muscular activity. The child entering in ordinary schools undergoes a physical as well as a psychical depression. Schoolroom discipline naturally tends to check this muscular activity, resulting in, or causing bad postures, nervous tension, strain and exhaustion."

One writer (113), in 1908, after citing statistics of scoliosis among school children, says: "So far we have proved that scoliosis is a disease which is caused by faulty position and occurs during school age. Can we find in school life anything which will habitually cause this faulty position in so great

a proportion that we can safely ascribe to it the formation of this great number of cases? The most cursory survey of the position of the majority of school children, is convincing, that the habitual position forced upon the pupils in our schools by faulty seats and by slant writing is the great cause of scoliosis."

Another author (32), in 1905, concluded that "there is such a thing as a school lateral curvature. Whether it is a left lateral curve or a curve of another variety is of relatively little importance, the point being that the school is a predisposing cause to deformity."

Schulthess (101) says: When we refer to a school scoliosis we mean a left convex total scoliosis of boys and lumbar scoliosis of girls. In the other forms of scoliosis the school is not to be recognized as the chief cause. His theory is, that the spine of the child which is naturally prone to bend to the left, is given an opportunity to assume the attitude and to maintain it for some time on account of writing. He thinks it is the prolonged sitting position which does the harm in children prone to the other types of curves.

Other recent observers, Kirsch (63), Schanz (97) and Chlumsky (26) have proved to the contrary that the school is not so much to blame for scoliosis as is ordinarily believed.

Chlumsky (25) examined 500 children, the majority of which did not attend school, or were not of the school age, and among them many had scoliosis. He is of the opinion that neither the school nor the bad posture in writing was the cause of curvature.

Dr. Burnham (20b) states the argument is usually somewhat as follows: "There are a relatively small number of cases of scoliosis. The number of cases increases greatly from the lower to the higher grades. The most common form of lateral curvature corresponds exactly to the temporary malpositions most frequently found among school children in their work in reading and writing at the school desk, hence the disorder is distinctly and directly caused by conditions of school life. Plausible and impressive as this argument is likely to be when supported by the old statistics of Eulenburg, Meyer, Krug, and others, yet recent investigations show it is seriously fallacious."

"School" lateral curvature, a condition caused by the school, was a frequent expression, and this general point of view was on the whole unchallenged until 1910, when the German Orthopedic Association (71) held a symposium on the question of the relation of scoliosis to school life, which led to the expression of some very radical views on the subject, and, curiously enough, these views on the whole agreed

with each other, in expressing the opinion that school life had received too much blame in the matter and that scoliosis of any more than a very mild degree was not likely to be caused by school conditions. As the men taking part in this discussion were the leading authorities of Europe, this consensus of opinion becomes important, and it seems worth while to try to find out from the data at our command, as nearly as may be, what place we should assign to school life as a cause of scoliosis.

While the school may not be directly responsible for the development of scoliosis, there is no doubt that the school, or rather certain conditions concerned in the routine of school life, bear an influence upon, or aggravate existing scoliotic conditions.

Citing again from Sever (108): "In fact, the school life of a child has a very real and important influence in direct relation to its physical development. School deformities are usually due to, or if, present, increased by prolonged sitting in faulty positions, combined with too little muscular activity. It is thought, however, by many observers that faulty postures alone are not enough to cause marked structural deformities, but given conditions in the child which imply lack of bone or muscle resistance, the deformity—more or less severe—may develop. Anything which reduces the general vigor and health of the child will consequently decrease its resistance to abnormal and long-continued strain."

It may be reasonable to assume, writes Lovett (71), that: (1) bad air, fatigue and school life under poor general conditions; (2) improper school furniture, and (3) twisted writing positions favor bad attitudes, and that the more constantly they are in operation, the more effective will be their result in producing bad posture. In the same way unfavorable home conditions, such as improper food, overwork and unsanitary surroundings, depreciate muscular strength and favor poor posture. It is also probable (14) that faulty attitudes of standing and sitting outside of school hours may be equally injurious.

In accordance with the opinion of the best modern authorities (70, p. 115; 110, p. 28) it is therefore likely on general principles that unfavorable school conditions are a competent cause of postural or false scoliosis and of slight grades of true scoliosis, but that they are not the cause of moderate or severe scoliosis.

In considering the existing data with regard to the occurrence of scoliosis in school life Lovett (71) says: We find no figures dealing with the question in America and it must be

remembered that data from foreign sources, although applying to our conditions, cannot be unreservedly accepted. There may be a great variation in the percentage of scoliosis in school children of two neighboring cities and between children of different schools in the same city.

In reference to the frequency of the occurrence of scoliosis, Sever (108) writes: "The frequency of scoliosis in school children increases with the age of the child and the class, but that constancy is not always found; and their susceptibility to compound or structural curves increases also with their age. There is a rapid increase between the ages of eight and thirteen years, especially between the ages of eight and eleven,—a period usually of rapid growth; which period also corresponds to the highest percentage of school attendance for persons of school age."

Kirsch (63) of Magdeburg, examined 1015 school children, of which 518 were boys and 497 were girls. There were 493 of them in the lower classes and 522 in the upper classes. He found 21.8 per cent of the girls in the lower classes and 41.1 per cent of the girls in the upper classes had scoliosis; also that 19 per cent of the boys in the lower classes and 24.4 per cent of the upper classes showed evidences of scoliosis. Seven and four-tenths per cent of the girls had fixed or structural scoliosis; and 7.2 per cent of the boys showed a similar condition.

The inference was that the influence of school life raises the proportion of scoliosis from twenty to thirty per cent; whereas, in the girls, the proportion of rise in the cases of fixed or structural scoliosis was 5.5 per cent; there was no increase in the boys.

Gronberg (70, p. 115), reported his observations on 8,350 school children in Finland, stating that 48.1 per cent showed evidences of bad attitudes and deformities.

Dukes (108) reports 445 cases of lateral curvature out of 1000 boys examined, giving a percentage of 44.5, with 126 cases of acquired pigeon breast.

Scholder (100, 108) examined 2314 school children at Lausanne, and found 571, or 24.67 per cent scoliotic; frequency equally divided between the two sexes. The majority of these 571 cases had a left curve. He believes this tendency to a left-sided lateral curvature is alone a sufficient argument that school is a determining factor in the causation of scoliosis; for the curve corresponds to the faulty attitude taken by the child when writing. His statistics show that the children who have been the longest in school have the greatest

percentage of postural deformity, and compares his figures with those of other observers in other places as follows:

	School Children		Scolioses	Percentage
Guillaunne, Neuchatal.....	731	(boys and girls)	218	29
Krug, Dresden.....	1418	(boys and girls)	357	25
Hagman, Moscow.....	1664	(girls)	....	29
Hallbach, St. Petersburg..	2333	(girls)	....	26
Scholder, Lausanne.....	2314	(boys and girls)	571	24.67

Average, about 27 per cent.

The investigation of Scholder, says Dr. Burnham (20b), shows that by studying the different kinds of scoliosis separately, we find that apparently only two forms of spinal curvature, namely, the total functional and lumbar scoliosis, increase from the lower to the higher grades; and these, if any, are the only forms that can be attributed directly to the evil influences of bad posture in the school.

Silfverskiöld (109) of Stockholm examined 3234 girls in Gothenburg schools, and found scoliosis present in 416, or 12.8 per cent. He states that the largest proportion of cases occurred in apparently robust girls of fifteen years of age and that many showed asymmetry of growth.

Haglund (108) examined 1599 cases, of which 283 were scoliotic and showing an increase with the school age.

The average of all observers shows that scoliosis is present in about twenty-seven per cent of the school children, with the greatest frequency between the ages of seven and fourteen years. From an analysis of 9485 school children examined by different and competent observers in various parts of Europe, there were twenty-five to thirty per cent affected with lateral curvature.

There is no reason to suppose that American children are any less affected than the children in Germany, Russia and Switzerland. We may note from this review of some of the statistics, that scoliosis is a real problem to be met with in the school child.

During my experience as a Physical Director in College work I found scoliosis quite prevalent among the entering classes. Let me quote from the Cornell statistics on scoliosis for the years from 1909 to 1912. In 1909—85.30%; 1910—78%; 1911—88%; 1912—87%. The reason for the falling off in 1910, could not be accounted for, excepting to say that it was probably due to the fact that the Medical Director did not make all the examinations himself. These cases are for the most part functional, yet all showed some degree of scoliosis.

Is there a school scoliosis? Schulthess (102) says: If it

were so, we would meet with a particular form. The most prevalent form found in school is the left convex total curve and in from twenty to sixty per cent of the cases. Statistics show an increase with the advance of classes. Again, he says, this form of scoliosis is found in children before entering school. In different places with varied writing positions, school examinations have given same results. All this, says Schulthess, does not go to prove the presence of a specific school scoliosis. He believes that there are other underlying factors that will be more convincing, to be discussed later.

Is there a school without scoliosis? Herz (52, 97), in New Zealand, examined 500 school children and found scoliosis almost absent, and this although school hygiene conditions are not so good as in Germany. The inference may be that scoliosis is not the result of the school.

The modern scientific methods, writes Dr. Burnham (20b), with more extensive and thorough investigations by the use of the X-ray and the broader study of infancy, have radically changed the views regarding the relation of scoliosis to school life.

The recent studies of Kirsch (62), Muskat (78), Schanz (97), Schulthess (102), Böhm (12), and others, have shown that we cannot understand the cause of scoliosis without a more careful examination and study of the conditions and diseases of infancy. Many cases begin, they say, before the children come to school, dating probably from the first years of childhood, when rachitis attacks the bony framework, and cause does not lie in the crooked posture of the school. Those whose scoliosis begins in school, do not reach the grade that those beginning before school and this form has little or no harm on general health.

Kirsch (63), after a most interesting study, states: (1) During school life of the child wrong postures develop in great numbers, but only a few become fixed scoliosis. (2) Seven times as many cases of fixed scoliosis are present on entering school, as arise during the school years. (3) Fixed cases are, in so far as they are not congenital, of rachitic origin. (4) Bad posture of school child, in which no symptom of fixed scoliosis may be found, does not lead to severe forms of scoliosis. But, after long continuance may show some fixation.

The best European and some American authorities agree that (1) rachitis is the chief cause of scoliosis and is responsible for more than 50 per cent of the cases; (2) Innate abnormalities play an important rôle in the etiology and may account for from 15 to 20 per cent, leaving about 30 per cent for other causes.

Are the children harmed by the form of scoliosis that may be developed in the school? It seems to me, any abnormal condition, whether functional or organic, will in some degree decrease the efficiency of the human organism. A slight curve, brought about by improper posture, may be rapidly increased, depending somewhat upon the general health and muscular development of the child.

Lovett (71) concludes, from his study of the relation between scoliosis and school life, to which I agree, that children of school age are the class most likely to be permanently affected by unfavorable environment, such as bad air, overwork and persistent assumption of bad attitudes. These unfavorable conditions are more likely to produce scoliosis than kyphosis. Also such conditions, as is the opinion of most modern authors, are an important factor in causing postural or false scoliosis and possibly some cases of mild structural type. But the more severe cases must be accounted for by congenital anomalies, rickets, and diminished resistance of the bones.

What can the school do to prevent scoliosis? In accordance with Schulthess (106) I should recommend: (1) The examination of all children on entering school, if scoliosis is present, a note made of the kind, location, direction and degree of severity of the curve and possibility of correction of the deformity. That subsequent examinations follow as it seems advisable according to the needs of the individual case. (2) A careful study into the conditions to which the scoliosis may be secondary. (3) Turning over cases of slight degree to the school polyclinic, and the severe cases sent to an orthopedic institute. (4) Creating special classes in open-air or forest schools for weakly and scoliotic children. (5) To provide every hygienic precaution in the school to prevent injurious influences to the growth and development of the child.

Etiological Factors: Dr. Chlumsky (26) in 1910 gave a full résumé of the results of his investigations on the etiology of scoliosis down to the date of publication. I shall then refer only to the more recent investigations.

There has been a tendency in the last few years toward the recognition of the congenital type of scoliosis. Formerly practically all cases were regarded as acquired, while congenital forms were considered a rarity. The study of the actual anatomic conditions of the human spine has been made possible by the development of the X-Ray. Most modern authorities give due consideration to this subject in the etiology of scoliosis.

In formulating an etiological classification, I have taken that of Schulthess (102) under which general heads, all necessary sub-divisions can be made. It is as follows:

I. Innate abnormalities.
II. Rickets and other diseases.
III. Through forcible changes of the mechanical functions of the spine, whether due to disease of the other organic system, or, to external force.

1. Innate abnormalities:

The conditions (7, 10, 57, 59, 70, 81, 119) which cause congenital scoliosis are various:

(1) Malformation of the vertebra, the bone itself or its articulation.

a. Deformity of vertebra. A wedge-shaped, incomplete or split vertebra, which lies between two normal vertebrae. The fusion of two vertebrae into a single one, or of vertebrae to other structures. Disease of vertebral structure. Dislocation, tuberculosis, arthritis deformens, or tumors.

b. Numerical variation in the spine. Persistence of a greater or smaller number of vertebrae than normal. It is thought there are more often supernumerary than deficient vertebrae. Bardeen (7) believes that about sixteen per cent of all human spines show numerical variation. Keneko (57) found in thirty-seven cases some fault in the vertebra itself. Cases of variation were most frequent; although wedge-shaped and adherent vertebrae were not rare. In several cases he observed a combination of these conditions.

Schulthess (113) refers to the importance of congenital anomalies in the lumbosacral region and describes cases with radiograms and diagrams.

Goldthwait (44) writes of the influence of pelvic joint or sacroiliac lesions. The modern scientific conception is that abnormal conditions in this region are accountable for most cases of sciatica.

Böhm (10, 12) in his extended studies and research at the Massachusetts General Hospital, believes the following statement to be justified: "That developmental error in the human body occurring in embryonic life, which has its morphological expression in the so-called "numerical variation" of the spine, causes, under certain circumstances, those idiopathic lateral deformities of the spine which manifest themselves in the first half of the second decade of life and which hitherto have been considered as affections acquired in post

natal life to pure functional, or functional osteopathic conditions."

c. Spinabifida.

(2) Malformation of the scapula. One scapula may be elevated, absent, or malformed.

(3) Malformation of thorax. Irregularities of ribs on one side or both sides, such as bifurcated or deficient.

(4) Malformation of the pelvis, may be congenital or acquired.

(5) Intra-uterine malformation (67), Böhm (9) thinks amnionic pressure in later months of uterine life is cause and Chlumsky (23) endeavors to show that a certain large percentage of scoliotic cases are due to the position maintained by the fetus in utero and that this is often combined with a lack of amnionic fluid.

(6) Congenital rickets, which at present is said to be rather infrequent.

(7) Heredity. The influence of heredity has been given some consideration. Hübscher (54) says: "There are families and entire races whose members are to be recognized by their back." Schulthess (70, p. 96) estimated that from ten to fifteen per cent of scolioses are hereditary. Congenital defects can be inherited, as well as acquired.

Koch (66) claims: "We will only then be able to tell which of the curvatures the spine presents are pathological, after a more thorough and exact study of the philogeny and ontogeny of the spine, than has hitherto been made. It is almost impossible to define the normal curvatures of the spine on account of normal deviation due to race, relations of the head, extremities, etc. He describes in detail the spines of numerous embryos from Leukart's 2.2 mm size upward, and also discusses the development of the vertebrates from the amphioxus to the mammalia and gives the various congenital racial deviations of the spine from the accepted European normal, among the African and Australian aborigines, etc. Koch believes, "All kyphoses, lordoses, and flattened spines without exception, also every variety of lateral deviation of the spinal column, have a congenital basis for their origin."

Böhm (9) believes the great majority of fixed scoliotic deformities of the chest, not including the symptomatic, those due to difference in length of legs, empyema, anterior-poliomyelitis and tuberculosis, and those not preceded by rachitic bone disease are caused chiefly by congenital anomalies of the trunk skeleton.

II. Rickets and other diseases. (a) Infantile rickets; (b) Adolescent rickets; (c) Osteomalacia; (d) Other bone deficiencies.

(a) Rickets or rachitis (21, 58) is a complex constitutional disease of early childhood, characterized chiefly by defective nutrition of the osseous structures and evidenced by constant lesions in the bones and disturbances of nutrition. I quote from Dr. Burnham's (21) résumé in substance, as follows: "There is a general opinion that the condition is caused by lack of proper food with hereditary tendency. The disease occurs mostly from the sixth to twentieth month of life and affects both sexes equally; it is more frequent and more pronounced in the poor than in the well-to-do, and more often found in the city than in the country. Rachitic cases are maximum toward the end of winter and minimum in autumn and the disease is more frequent in the temperate zone than in the tropical or sub-tropical countries or the extreme north. Rickets is said to occur seldom in white children on normal breast feeding, it is rarely absent in babies fed for a long time exclusively on proprietary foods without fresh milk."

Dr. Burnham said recently, if he were writing of the subject of rickets now he would add, that, if we go still further back for the ultimate or primary cause of rickets, we perhaps should find it in a disorder in functioning or reciprocal relations of the thymus, thyroid, and parathyroid glands.

Rickets (11, 12, 59, 63, 64, 65, 67, 70, 102, 104, 111, 119) has long been recognized as a cause of scoliosis. The trend of recent opinion is toward assigning rickets as a cause of a very much larger number of cases than formerly.

Some authors (12, 65) believe that practically all organic scoliosis, not due to congenital defect or some obvious cause as empyema or paralysis, is due to rickets.

Kirsch (64), who is an advocate of this view, asserts that among the school children of Magdeburg sixty per cent show signs of rickets and ninety per cent of children who come to the polyclinic are rachitic.

Spitzy (111), in 1905, called attention to the importance of considering rachitis as a cause of early scoliosis. He showed, in what was thought to be a rachitic Kyphosis, there was often found asymmetry in the saggital direction.

Schulthess (104) states: "If in scoliosis we find a right-sided posterior rib convexity and flattening of the skull posteriorly on the left and anteriorly on the right then it may be assumed with certainty that the origin of the scoliosis dates back to the earliest childhood and that the form is rachitic."

Herz (52) found rachitis as well as scoliosis absent in his

examinations of school children in New Zealand. Drs. Böhm and Kirsch of Germany in personal letters have stated that the German Orthopedists are of the universal opinion that rachitis is the chief cause of scoliosis in Germany. Dr. Böhm says: It should be noted that rachitis is more frequent in Germany than in America and yet we shall find it an important etiological factor here.

(b) Adolescent rachitis is most interestingly discussed by Dr. Horwitz (53), of Saint Louis, who concludes that the disease is a recrudescence of a disturbance which existed in childhood; that this recurrence is due to a disturbance in nutrition at the time of great bone activity; that the development of the genitalia is an important factor in the nutritional disturbance at this period.

(c) Osteomalacia (58, 70, p. 99) a condition of bone softening somewhat like rickets, is comparatively rare in infants and may be found in adolescents and adults accompanied by scoliosis.

(d) A softness of bone may exist, write Lovett and Sever (74), not rickets, in which bony deformity is so great it is evident that osseous resistance is below normal. Schulthess (64, p. 96) says, there is a possibility in the beginning of scoliosis being due to defects in the spinal epiphyses.

III. Through forcible changes of the mechanical functions of the spine, whether due to disease of the other organic system or to external parts.

(1) Anatomical, physiological, or other asymmetries elsewhere than in the spine: torticollis, pelvic asymmetry or pelvic obliquity (90) from short leg due to knock knee, bow leg, or flat foot. Unequal vision and eye strain (48, 60, 61, 121) or unequal hearing.

(2) Pathological affections of the bones and joints of the extremities, causing asymmetrical position.

(3) Distorting conditions due to disease of the soft parts, such as: infantile or spastic paralysis; hemiplegia; empyema; organic heart, throat, abdominal and pulmonary diseases; acute or chronic inflammation of the spinal muscles, as lumbago, etc.

Cyriax (30) is of the opinion that diseases of the abdominal organs and heart, especially those of a systolic nature, can bring about spinal curvature in two ways: (1) Through localized contraction of muscles from reflex nerve irritation. (2) Through the assumption of vicious attitudes on the part

of the patient in order to relieve symptoms. These two causes often co-exist.

Jansen (56) ascribes various scoliotic conditions to diaphragmatic influences.

(4) Posture and occupation. Previous to 1900, it is possible, more was written on these two topics as causes of scoliosis, than all other conditions together. In the consideration of posture we may include: lying in bed (38, 110); sitting either at ease, or as in reading and writing; standing, resting on one leg as sometimes in violin playing and the various trades; relaxed positions resulting in weak spinal muscles producing a vicious cycle. Influence of clothing, etc.

Sir Henry Holland says: "Standing has all the disadvantages of posture without any of the benefits of exercise." Sir James Paget said "and for spines it may be said that sitting upright has similar disadvantages without the benefits of rest."

Occupations, especially those of a weight-bearing nature, such as: carrying books, newspapers, packages, groceries, milk, and the like and more often when there is a poor muscular condition, if not primary, are important contributing factors in the development of spinal curvature.

To quote from Dr. Brackett (13a): "Whatever may be the initial point in the etiology of lateral curvature, there is one underlying condition which is an important factor in its increase and growth—that of a gradual structural change which occurs under the maintenance of the distorted position. Not only do the ligaments and the bones yield to the force of unequal pressure, which must necessarily result from the deformity, but the muscles also undergo adaptive changes, and when once the distortion is established, with the unequal distribution of weight and muscular action which is necessary in an equal poise of the body, all factors act in one way to increase the development of this condition."

While some authors doubt that any of these factors just mentioned, under posture and occupation, either alone or combined, can produce scoliosis, yet all agree that they are secondary and contributing, and that by the influence of secondary conditions the scoliosis, which through rachitis or some spinal anomaly was not detectable, became aggravated and increased to such an extent to produce a more noticeable deformity.

Investigations show that many of the factors in the third group are found in a single individual and that further examination revealed a previous condition of rickets, or the presence of a spinal anomaly.

Böhm (11, 12) concludes as a result of his more recent studies that in scoliosis it is not a question of a healthy spine

which through poor posture or weight-bearing influences becomes bent, but a question of abnormal skeleton, caused by two things: (1) Rachitis which has its harmful influences upon the form and growth of the bone. (2) Disturbances of development in embryonic life. He believes rachitis and congenital anomalies are the two primary and essential causal factors which work hand in hand with secondary factors—namely: growth, burdening and the function of the organism.

While this opinion does not settle the problem in a perfect way, says Böhm, it is sufficient explanation for the vast majority of scolioses. A small percentage still remains unexplained. In these cases either the X-ray knowledge is insufficient to determine the anomalies present or the changes are of a congenital nature which we do not sufficiently know. The avenues for investigation are through the X-ray and further anatomical research.

Finally, we may say, the present state of our knowledge of the etiology is unsatisfactory and vague—claiming many causes either primary or contributing. We must look in every direction—investigate and study the conditions of normal growth and the pathology of growth. More especially should we study the innate or congenital abnormalities and the functioning of the glands of internal secretion.

Account of Investigation

Examination: In connection with the annual anthropometric examinations of the High School students in Worcester, I attempted to make a personal study of the etiology of scoliosis. As my study was concerned with scoliosis, no attempt was made to make a special study of the other anthropometrical data beyond reckoning general averages.

Unfortunately the time allotted for the examination was limited and the facilities inadequate; the results, therefore, are far from being satisfactory, but under the existing conditions it was difficult to do anything more, at this time, than to make a rough classification of scolioses, with the general postural defects. No doubt photographs would have been very helpful and the X-ray disclose many spinal abnormalities, but this was impossible.

Inspection (70, 75): The boy was placed in the best available light, facing a mirror, so that any physical defects could be brought to his notice. Standing in a natural position, arms at side, the weight equally on both legs, the body was viewed from the front, side and rear, noting the posture, carriage, symmetry and general contour; comparing on both sides the outline from the axilla to the crest of the ilium,

whether one was flatter or more curved than the other, whether one arm hung further from the side than the other. If asymmetry or lateral displacement of the trunk was present with a change in body outline, it was considered, as stated by Lovett (70), a presumptive evidence of a lateral curve.

Posture: Whether good, fairly good, fair, or poor.

In examining for postural defects, the degree was considered, as well as its relation to other defects and abnormal conditions, and in the following order:

a. Head: The habitual position, whether forward, tipped to one side, or held rotated.

b. Chest: Whether flat and presence of any abnormalities of the sternum or ribs.

c. Shoulders: Round-Kyphosis,—whether there was round back or round hollow back.

Shoulders: Level of—whether one was higher than the other, and if this was a constant position. Lovett (70) says: "Elevation of one shoulder is generally a sign of lateral curvature, but may exist rarely with no perceptible curve."

d. Scapulae: Whether prominent and if two sides compared. Relative distance from spine, if one was low, or one or both displaced forward.

e. Lordosis: Whether alone, or associated with prominent abdomen.

f. Hips: Whether there was prominence of one hip, or any tilting of the pelvis.

g. Spine: The spinous processes of the vertebrae, beginning at the fifth cervical to the last lumbar, were marked with a flesh pencil, and an imaginary perpendicular erected from the cleft between the buttocks, to observe lateral deviations of the spinal column. If any deviation was present the boy was asked, first,—to bend forward to see if the curve was decreased or eliminated, or, exaggerated or increased; also to note if rotation was present and if increased, to what degree and where located, *i. e.*, on side of concavity or convexity; secondly—to bend sideways for muscular spasm and rigidity; thirdly—measurements for asymmetry (119) were taken in cases where time was afforded and facilities were present; fourthly—he was asked to assume his habitual posture of resting on one leg, and whether engaged in work of a weight-bearing nature and method of carrying his burden. Then a record was made of the kind, location, direction, and degree of the curve; and a note of any prominence or irregularity of the vertebrae.

h. Legs: Whether bow legs, knock knee, or rachitic tibia.

i. Feet: Whether flat footed.

Results: Following the method described above, 1100 boys in the department of Physical Education in the Worcester High Schools, were examined by me in the fall of 1913. The results are given in the following tables:

DEPARTMENT OF PHYSICAL EDUCATION FOR BOYS, WORCESTER HIGH SCHOOLS

Physical and Medical Examinations of 1100 boys, made in the fall of 1913

	Age	Height	Weight	Lung Capacity
Average.	15.8 yrs.	64.5 in.	113.3 lbs.	199.2 cu. in.
Minimum.	12.2 "	52.9 "	60 "	90 "
Maximum.	22.1 "	75 "	197 "	330 "

The average of all the boys, for each year, is as follows:

	No. of Boys	Age	Height	Weight	Lung Capacity
1913.....	1100	15.8 yrs.	64.5 in.	113.3 lbs.	199.2 cu. in.
1912.....	1156	15.9 "	64.5 "	113.2 "	196.5 "
1911.....	1100	15.7 "	63 "	107 "	185 "

The average of the boys who were examined in 1911 and 1912 (both years) is as follows:

	No. of Boys	Height	Weight	Lung Capacity
1912.....	723	65 in.	117 lbs.	205.6 cu. in.
1911.....	723	62.9 "	106.8 "	182 "
Increase.....		2.1 in.	10.2 lbs.	23.6 cu. in.

The average of the boys who were examined in 1911 and 1913 (both years) is as follows:

	No. of Boys	Height	Weight	Lung Capacity
1913.....	400	67 in.	127 lbs.	229.1 cu. in.
1911.....	400	63.4 "	107 "	180 "
Increase.....		3.6 in.	20 lbs.	49.1 cu. in.

Postural defects:

Head forward ..... 719 = 65%
Flat chest ..... 378 = 34%
Scapular prominent ..... 416 = 38%
Lordosis. . . .. 407 = 37%
Round shoulders ..... 936 = 85%
(slight 166 = 15%, fairly marked 658 = 60%, marked 112 = 10%)
Shoulder low ..... 956 = 87%
Right 768 = 70% (slight 189 = 17%, fairly marked 534 = 49%, marked 45 = 4%)
Left 188 = 17% (slight 41 = 3.7%, fairly marked 144 = 13%, marked 3 = .3%)
Prominent hip ..... 930 = 85%
Right 771 = 70% (slight 153 = 14%, fairly marked 553 = 50%, marked 65 = 6%)
Left 159 = 15% (slight 33 = 3%, fairly marked 117 = 11%, marked 9 = 1%)

Scolioses:

Total number of curves..... 902
Functional curves ..... 595 = 66%
Dorsal 28 = 3%—Right 9 = 1% (slight 2, fairly marked 7)
Left 19 = 2% (slight 10, fairly marked 9)
Lumbar 59 = 6.5%—Right 20 = 2% (slight 7, fairly marked 13)
Left 39 = 4.5% (slight 23, fairly marked 16)
Dorsolumbar 50 = 5.5%—Right 10 = 1% (slight 2, fairly marked 7, marked 1)
Left 39 = 4.5% (slight 5, fairly marked 29, marked 6)
Total 458 = 51%—Right 52 = 6% (slight 20, fairly marked 32, marked —)
Left 406 = 45% (slight 121, fairly marked 281, marked 4)
Structural Curves ..... 307 = 34%
Dorsal 4 = .4%—Right 2 = .2% (slight —, fairly marked 2)
Left 2 = .2% (slight —, fairly marked 2)
Cervicodorsal 2 = 2%—Right 2 = .2% (slight —, fairly marked 2)
Lumbar 3 = .3%—Right 1 = .1% (slight —, fairly marked 1)
Left 2 = .2% (slight — , fairly marked 2)
Dorsolumbar 33 = 3.7%—Right 10 = 1% (slight 2, fairly marked 8)
Left 23 = 2.7% (slight 3, fairly marked 20)
Lumbosacral 2 = .2%—Right 2 = .2% (slight —, fairly marked 2)
Right dorsal—left lumbar 151 = 16.7% (slight 103, fairly marked 48)
Right cervicodorsal—left dorsolumbar 3 = .3% (slight —, fairly marked 3)
Left dorsal—right lumbar 103 = 11.6% (slight 59, fairly marked 44)
Left cervicodorsal—right dorsolumbar 4 = .4% (slight —, fairly marked 4)
Right cervicodorsal—left dorsal—right dorsolumbar 2 = .2% (fairly marked 2)

Scolioses:

Total number of curves	902
Scoliosis and rickets	402 = 44.5%
Scoliosis and poor posture	401 = 44.5%
Scoliosis and poor muscular function	242 = 27%
Scoliosis, poor posture and poor muscular function	222 = 24.5%
Scoliosis and weight bearing occupation	269 = 30%
Rickets and structural curves	226 = 25%
Occupation and rickets	124 = 14%
Occupation and poor posture	169 = 19%
Occupation and poor muscular function	136 = 15%
Occupation, poor posture and rickets	91 = 9%
Occupation, poor posture and poor muscular function	88 = 9%
Occupation, poor muscular function and rickets	70 = 8%

Posture:

Good 129 = 12%, fairly good 167 = 15%, fair 394 = 36%, poor 410 = 37%

Muscular function:

Good 243 = 22%, fairly good 205 = 19%, fair 401 = 36%, poor 251 = 23%

Teeth:
Good 478 = 43%, fairly good 197 = 18%, fair 316 = 29%, poor 109 = 10%

Abnormal conditions: 137 = 12.6%
Heart:
Weak 19 = 2%, rapid 42 = 4%, irregular 45 = 4%, mitral systolic murmur 28 = 2.4%, aortic diastolic murmur 3 = .2%
Nasal obstruction ..... 68 = 6%
Large tonsils ..... 97 = 9%
Hernia. . . .. 15 = 1.3%
Phimosis. . . .. 18 = 1.6%
Varicocele. . . .. 54 = 5%
Flat foot ..... 437 = 40%
(slight 214 = 19.5%, fairly marked 208 = 19%, marked 15 = 1.5%)

Osseous abnormalities:
Pigeon breast 243 = 22%, funnell chest 8 = .7%, prominent sternum 21 = 2%, prominent ribs 16 = 1.5%, lateral groove 56 = 5%, knock knee 353 = 32%, prominent vertebrae 24 = 2%, bow legs 67 = 6%
History of eye trouble..... 154 = 14%
Wear glasess ..... 86 = 8%
History of ear trouble..... 46 = 4%

History of diseases:
Rickets (history or osseous evidence of) 434 = 39.5%, measles 733 = 66.5%, scarlet fever 105 = 9.5%, diphtheria 90 = 8%, pneumonia 91 = 8%, pleurisy 18 = 1.5%, rheumatism 46 = 4%, tonsilitis 219 = 20%, bronchitis 103 = 9.5%, headache 306 = 28%, nasal catarrh 94 = 8.5%, typhoid fever 21 = 2%, nervous prostration 7 = .6%.

History of fractures:
Arm 8 = .7%, elbow 17 = 1.5%, forearm 18 = 1.7%, wrist 28 = 2.6%, thigh 3 = .3%, leg 12 = 1%, clavicle 18 = 1.7%

History of operations:
Adenoids 172 = 15.6%, tonsils 224 = 20.3%, adenitis 23 = 2% pleurisy 4 = .3%, hernia 22 = 2%, appendix 24 = 2%, kidney 1 = .1%

Use of tobacco: 198 = 18%
Pipe 89 = 8%, cigarette 156 = 14%, cigar 64 = 6%, chewing 12 = 1%

Use of stimulants: 792 = 72%
Tea 162 = 15%, coffee 298 = 27%, tea and coffee 332 = 30%

Engaged in weight bearing occupation: 277 = 25%
Newspapers 186 = 17%, packages 49 = 4.4%, groceries 26 = 2.3%, milk 16 = 1.3%

Observation: In making observations or comparisons, it is essential that one should have a standard. "In different persons healthy spines may be as unlike as any of their features." There are several interesting descriptions of normal types and, as may be expected, these vary to some extent. A type of normal posture is well illustrated by Staffel (102),

a method of determining the position of the centre of gravity, in its relation to certain bony landmarks in the erect position, is given by Reynolds and Lovett (89), and the correct attitude described by Dr. Goldthwait (47). I have accepted these standards for my investigations.

Observations during the examination show that there are some boys in the High Schools who have a good physical development; but that the average boy is poorly developed in the chest, arms, and shoulders. Many carry the head forward, have round shoulders, flat chest, one shoulder and scapula low, or a hip prominent, with a more or less degree of lordosis and prominent abdomen. Lateral curvature exists in a large number of cases.

Postural defects are far more common among boys than is generally known. Some have no idea they present poor posture until the condition is called to their attention. In many cases while aware of being somewhat round-shouldered they were more or less ignorant of having a shoulder low, a hip prominent, or lateral curvature of the spine.

In the examination of the spine for lateral deviation, four factors were constantly in mind.

I. History or osseous evidence of rickets.
II. The habitual posture.
III. The general muscular function.
IV. If engaged in work that would bear influence on posture, or symmetrical development, and more especially weight-bearing occupations and method of carrying one's burden.

There are many varied forms of classification of curvatures. For my investigation, I accepted the one used by Dr. Lovett (73) and approved by Dr. Burnham. Dr. Lovett says: "The name scoliosis or lateral curvature covers more than one type of deviation and the division between the groups is clearer than between most functional and organic affections of the same structure or organ."

It is as follows: First, Functional, also spoken of as postural or total scoliosis, called by some faulty attitude, or "false" scoliosis, a term used by the more recent German writers. This group includes all curves in which for the most part the associated characteristic signs were present. The spine is apparently structurally normal, but curved to one side owing to a defect in lateral balance due to some anatomical bodily asymmetry. Second, Structural: (1) curves where the changes are comparatively slight and seem no more than would be accounted for by the maintaining of a normally growing spinal column in a faulty attitude over a period

of years. These cases are often spoken of as "Static" and do not imply in general, pathological conditions in bone or elsewhere: (2) curves due to conditions causing definite pathological changes in the bone.

We term "curvatures" any deviation of the spine from the normal curves. Lateral curves often lead to more severe deformities. Postural or "false" scoliosis should not be confused with real, organic or structural scoliosis. Bad posture is to a great extent voluntary, changeable, and depends largely upon muscular development and leads to more positive signs of scoliosis which may be present. If the muscles are symmetrical there is an increase in the antero-posterior or normal physiological curves and we have round back or round hollow back. If there is asymmetry in structural elements or muscular balance there occurs a lateral bend of the spine.

The typical functional curve presented a type somewhat of this sort: head inclined forward, more or less round shoulders (kyphosis), in several cases, flat chest with scapulae prominent and lordosis. Often a back of the round hollow type, a shoulder low and scapula low and hip prominent on the same side and a total curve convex to the opposite side. Often a slight rotation on the side of the concavity. In some cases there was displacement of the trunk to the side of the concavity of the curve. This curve was almost or entirely eliminated on bending the trunk forward, depending somewhat upon the degree of the curve. Several cases showed the right hip drawn up, making the legs apparently of different lengths, but the measurements showed no shortening.

The characteristic sign of a structural curve is the presence of a backward prominence of the chest or loin on the convex side of the lateral curve. The majority of cases were of a rather slight degree, those of the dorsolumbar type seemed, in part, to be in or just over the border line, of the transitory stage.

With the increased poor posture, kyphosis, lordosis, and scoliosis, the abdomen was prominent and no doubt in these cases a more careful examination would reveal a more or less degree of visceroptosis.

The results show that 39.5 per cent of the 1100 boys examined have a history or osseous evidence of rickets; it was impossible to obtain definite information in regard to rickets in all cases. Thirty-seven per cent have poor posture and had I considered the cases of fair posture this percentage would be doubled. Twenty-three per cent have poor muscular function, and had I considered fair muscular function, the percentage would be increased three times. So would there also be an increased percentage in all other statistics in which

these two latter factors are involved. Twenty-five per cent are engaged in work of a weight-bearing nature that decidedly influenced posture and symmetrical development. In many cases two or three of these factors were present and in some cases, as shown by the statistics, all were present.

There were 902 scoliotic cases, of which 66 per cent, or 54 per cent of all the boys examined, have a more or less functional lateral deviation of the spine, and 34 per cent, or 28 per cent of the 1100 boys examined have curved or twisted backs of a more or less degree. About 40 per cent were slight, 58 per cent fairly marked, and 2 per cent marked. The total curves represent 51 per cent of all cases. Compound curves are about 23 per cent of all cases.

Many of the curves under the dorsolumbar of the functional type, no doubt could be called total and some low dorsal or lumbar, for seldom a curve is found in the lower dorsal region that does not involve some of the lumbar vertebrae and often a lumbar curve involves several of the dorsal vertebrae. These curves may be in the initial stage of passing from a total functional curve to a structural curve, since some of them showed one or more of the characteristic signs accompanying the functional curve absent.

A subsequent 100 examinations of boys entering in February, 1914, gave the following results: 48 per cent showed evidence of rickets; 18 per cent have poor posture; 18 per cent have poor muscular function; 19 per cent are engaged in work of a weight-bearing nature. There were 40 scoliotic cases, of which 27 or 67 per cent have a functional curve (25 of the 27 were of the total type) and 13 or 33 per cent have structural scoliosis. The proportion of functional to structural curves was the same as in the 1100 examinations.

In general, scoliosis occurred in boys who are weak, poorly nourished, lacking bone and muscle resistance in addition to having faulty posture. Often the history shows diseases and other defects which greatly reduce the vigor and health of the child, decrease his resistance to abnormal and long-continued strain and predispose him to spinal curvature.

In order to avoid or prevent a condition it is necessary to know something of its causes. I studied my results with special reference to etiology. The data indicate the following chief causes: 1, rickets; 2, poor posture; 3, poor muscular function; 4, weight-bearing occupations. The statistics show the relative influence of each of these factors.

This general result of my data is in harmony with what Doctors Böhm and Kirsch of Germany, Dr. Chlumsky of Austria, and Doctors Bradford and Lovett of Boston, and others have found in their recent investigations.

Another point should be noted, that is the influence of adolescent rachitis. This is significant in my research from the point of view of etiology, since the majority of boys were in the adolescent stage and their nutrition seemed to be on a par with their general muscular development. Statistics show that about 40 per cent have fairly good or better muscular development, and about 60 per cent have fair or poor muscular development.

Sir James Paget said: "One may make too light of a case of lateral curvature, and be ready to think and say 'There's nothing the matter.' The great difficulty is in proving a negative, and as a general rule, it requires much more time and care in examining a patient to justify a decision that there is no disease than it does to ascertain what the disease is if there be any." I may be permitted to say that often I spent more time in deciding that there was no curve, or that the curve was of a functional nature, than in well-marked curves, for when a case is decidedly evident there is little difficulty in diagnosis.

A résumé of my results, in a word, is that in 1100 examinations there were 902 scoliotic cases, of which 66 per cent were of a functional type and 34 per cent of a structural nature. The important etiological factors are rickets, poor posture, poor muscular function and weight-bearing occupations.

Thus we may see that the problem of the etiology of scoliosis is a very complex one. I have attempted merely to make one slight contribution toward its solution. A few years ago there was a wide diversity of opinion; to-day the leading authorities are arriving at definite conclusions, and this has only been made possible through persistent study and careful research.

Conclusion

Prophylaxis: (8, 13, 14, 20b, 23, 30a, 32, 49, 54, 56, 67, 75, 91, 97, 112, 114, 119, 120).

We should be concerned with the prolongation of life and more so with the preservation of health. "Not cure, but prevention; not correction, but nurture," is the modern conception of efficiency.

Prophylaxis of deformities, like the education of children, should begin before they are born (91). Every child is entitled to a birthright of a good, strong, healthy, constitution, and such guardianship of its early life as would have judgment enough to know and take interest to see that all is well with the child physically and morally.

That scoliosis can largely be prevented, especially the ac-

quired forms, is the opinion of European and American authorities (114), who have made a careful study into the etiology of scoliosis among children. "In the entire domain of medicine and surgery, prophylaxis has never done so much good as prophylaxis of scoliosis."

One of the most important functions of any system of education, says Dr. Bradford (14), is to furnish to the community the constant supply of well-trained individuals with the capacity and physical strength capable of enabling them to take up the responsibilities and work that the community demands. Whatever occupation an individual is destined to undertake, an important qualification is sufficient physical strength to meet the burden of toil that comes and the strength and stability of the back is by no means of the least importance.

The carriage of the spine, writes Hübscher (54), is typical of the whole external appearance of mankind. Slothfulness and strength of will, depression and frankness, gloom and happy temperament, laziness and work, weakness and strength, youth and age, put their stamp upon the back, and that too, for generations.

"A sound mind in a sound body" is a good maxim, but not every one inherits a sound mind or a sound body. The human organism is not a perfect machine. In general we find few individuals who are absolutely healthy. Some of us inherit certain physical defects, others acquire them through bodily abuse, bad habits, improper nourishment, accidents, faulty modes of living, etc.

The human body is built and operates according to definite laws, and discord of the normal physiology can often be traced to disobedience of these laws. The spine is the chief support of the body, and when there is disorder in the spine the whole organism may be affected. Weakness in the spine permits the shoulders to become stooped, the chest contracted, and the vital organs drop below their normal position in the body. Many have the framework without the muscles to keep the body in position.

Dr. McKenzie (75) writes: "The integrity of the spine is protected against the onset of deformity by three lines of defense of increasing strength: (1) the muscles forming an advance mobile series of outposts brought into service in relays, powerfully but intermittently; (2) the ligaments more resistant, but less mobile, require long continued and persistent attacks to overcome their normal protective action; (3) the bones which may be compared to a citadel, yielding to the influence of deformity only after the other two lines of defense have long since been carried. When they have

adapted themselves to the deformity and have become set in their destruction, treatment can hope to be, at best, only cosmetic in character, to conceal the deformity rather than to correct it."

The flexible spinal column, says Keppler (59), is so formed by nature as to allow extreme latitude of body motion in nearly every direction. Moreover it bears, in whole or in part, continuous strain from the superimposed weight and general muscular activity. It is therefore natural that weakness or injury, however trivial, will more easily affect this structure than any other portion of the skeleton. On account of its length, flexibility and supportive function even the slightest deviation from the normal may easily, in time, develop into lasting deformity. The outgrowing of spinal curvature, without assistance, is usually out of the question and early intervention is the safest means to prevent more or less marked ultimate body deformity.

No deviation of the spine should be allowed to correct itself; and close observation of children during growth and puberty should be made the rule, rather than the exception.

The correct attitude (47) in the upright position, is the poise in which there is the least strain, with the body held so that it is made as tall as possible without raising onto the toes. In this position the head is erect, the shoulders are thrown back so that their centre is distinctly posterior to the centre of gravity, the chest is high, the abdomen is flat and the spinal curves are slightly convex backward in the dorsal region and convex forward in the lumbar region. The pelvis is inclined forward. The knees are straight and the weight is received on the foot, so that the heels rest lightly, and the chief weight is thrown upon the ball of the foot.

Hygienic Suggestions: In conclusion there are many factors and conditions to be considered in the prevention of scoliosis, and among them the following:

1. The proper early hygiene of the child, which is very important, especially his nutrition, the avoidance of rickets and all the predisposing or exciting causes of weakness as well as of deformity. In children with rachitic tendencies, attention should be directed to the spine in diagnosis and therapy.

2. The infant's spine should be examined (23) as a routine measure and any tendency to scoliosis should be recognized at once and corrected before it becomes chronic.

3. Determining and correcting a possible exciting cause, such as congenital or acquired defect; a tilting head due either to torticollis, deafness of one ear, or disturbed vision; a re-

ceding chin from adenoids; or a faulty position of the spine, due either to shortness of one leg, fracture, disease, paralysis, etc.

4. Jansen (56) is of the opinion that children should not sit before they can walk. The child when a few months old should be allowed to lie on its ventral parts and encouraged to lift the head and strengthen the muscles of the back. The child will learn to crawl and creep before it stands. Thus the child should get on its legs by its ventral parts, not by its posterior parts. The phylogenetic process of development of the human gait should be repeated ontogenetically.

5. A normal child properly fed and looked after from infancy will not develop deformities, any more than it can get rickets, scurvy, etc. Therefore the same rule applies to them all; appropriate food and suitable exercises in a healthy environment. On the whole the same measures which are applied in order to prevent the formation of scoliosis, will also tend to cure it if carried out sufficiently long and with adequate energy.

6. The child should have out-door life, abundance of fresh air and sunshine, with physical activity in the form of play. Good, healthful, and well-equipped playgrounds and gymnasia under competent supervision.

7. Physical exercises (68) well selected, regulated and directed, supplemented by good habits and hygienic conditions of life, will strengthen the body and promote normal growth and development.

8. An exposition of the combination of fresh air, bright sunshine, clean and wholesome food, sanitary environment, hygienic care of the body and regular and well-directed physical exercise, will promote proper development of the body, give tone and power to the muscles, increase the vital functions and materially improve the general health.

9. Good posture, Miss Bancroft (6, p. 2) says, is necessary, (1) for full vigor and health; (2) to prevent waste of energy in maintaining the upright position in any of the activities of life; and (3) with children to admit proper growth and development. The best health and greatest efficiency of the individual are possible only when the body is used in such poise that there is no undue strain or interference with any of the structures.

The child's attitude while sitting, standing, walking and sleeping should be observed and corrected, if found faulty.

10. There should be no superimposed weight or carrying of heavy books or other burdens that tend toward asymmetrical development. Children should be taught to carry books

in a knapsack strapped on the back, each side of which is equally weighted.

11. In infancy the clothing should be of light weight with no constricting bands; later no suspenders or heavy dresses. Have the support upon the base of the neck instead of tip of the shoulders.

12. There should be complete coöperation of the home and the school. They should work together and in harmony. The parents, or one in charge of the child, as well as school teachers, should be informed and instructed in hygiene and prophylaxis.

13. In addition to what has been said before as to what the school can do to prevent scoliosis, Bosse (13) concludes that the school should be equipped as well for straightening bodies of children as for enlightening their minds, for by preventing further and extreme deformities much can be saved the state. While the essential object of school inspection, writes Newmayer (80), is the detection of contagious diseases, among the pupils, of no less importance is the diagnosis and correction of physical defects.

14. The ideal would be, Haglund (49) suggests, to have a medical man or woman connected with the school, giving up practice, to take charge of the physical training of the pupils and diagnose incipient curvature. He advocates that medical students be instructed in orthopedic gymnastics. Then, he says, the physician would appreciate better the important matters of physical training, prevention, diagnosis and correction of deformities and the necessity for the technique of orthopedic treatment.

15. The prevention of the deformity in early childhood is much easier than correcting the deformity, especially in our schools, where the faulty attitudes leading to this condition are frequently found. The student should be encouraged to maintain a normal erect posture, where the body is firmly supported and the head and shoulders held erect, this being vitally important for unhindered respiration, for normal circulation, and maintaining the proper position and normal development of the internal organs.

16. Children who have suffered from rickets (20a), as infants, are more liable to develop spinal curvature, flat foot, and the like, and hence should receive special care during the school period with regard to diet, posture, physical exercise and general hygienic surroundings.

17. The proper lighting and ventilating of school rooms, hygienic seats and desks that make a normal posture easy and natural, proper methods of reading and writing, shorter

periods of sitting and more frequent intervals for recess outdoors should be provided.

Finally, in the words of Dr. Burnham (20b), the children should receive "above all, intelligent methods of instruction and training. This is one of the cases where the function of the teacher and the hygienist cannot be separated, and where it is the duty of the school to develop a permanent habit of health."

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THE PRESENT STATUS OF THE JUNIOR HIGH SCHOOL

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The term "Junior High School" is applied to a unit of the school sytem composed usually of the last two grammar grades and the first year of the high school. This division is organized with departmental teaching, differentiated curricula, and other features which formerly belonged to the high school. "Intermediate School" is preferred to "Junior High School" in many places, although the terms are practically synonymous. It is the purpose of this article to give the condition with reference to this movement as it exists at present.

To get in touch with the school systems that include junior or intermediate departments, requests were sent to the different state superintendents for information regarding such cities in their respective states. A list was also made of cities referred to in the government bulletins, educational periodicals, and other literature. Syllabi and requests for printed matter were then mailed to the different city superintendents. They were also asked to report any city in their state that had the junior organization. In this way it seems that the names of practically all the cities have been procured.

One hundred and thirty-five places were so reported, and replies were received from one hundred and eight. It was found that some of the one hundred and thirty-five are not organized upon this basis, and that others will be organized as soon as preparations can be made. Direct information has been received that this movement exists in twenty-three states, and five more are reported either as having junior schools, or as preparing to organize them. Returns have been received from sixty-eight cities that have the junior or intermediate school in actual operation. Minnesota, with six systems, Indiana with six, California with eight, Wisconsin and Kansas with nine each, seem to be the states having the largest number of these schools. Besides the exceptional response to the questionnaire, school officials have been most generous in supplying added material in the form of letters, courses of study, and other special literature.

The following cities have the junior or intermediate school. The figures denote the grades included.

Aurora (East), Ill., 8.
Austin, Minn., 7-8-9.
Berkeley, Cal., 7-8-9.
Bismarck, N. D., 7-8. 9 later.
Boston, Mass., 7-8. 9 later.
Bristol, Va., 5-6-7.
Chanute, Kan., 7-8-9.
Chico, Cal., 8-9.
Clinton, Ia., 8-9.
Cokato, Minn., 7-8-9.
Columbia, Tenn., 7-8.
Columbus, O., 7-8-9.
Concord, N. H., 7-8.
Crawfordsville, Ind., 7-8.
Crookston, Minn., 7-8.
Curwensville, Penn., 7-8-9.
Dayton, O., 9.
Decatur, Ill.
De Pere, Wis., 7-8.
Detroit, Mich., 7-8-9.
Devil's Lake, N. D., 7-8.
Edgerton, Wis.
Ephrata, Penn.
Evansville, Ind., 8-9. 7 later.
Faribault, Minn., 7-8-9.
Fort Scott, Kan., 7-8.
Fresno, Cal., 7-8.
Globe, Ariz.
Grafton, N. D., 7-8.
Grand Rapids, Mich., 7-8-9.
Hackensack, N. J., 7-8.
Hays, Kan., 7-8-9.
Houston, Tex., 7-8-9.
Hutchinson, Minn., 7-8.
Kalamazoo, Mich., 7-8-9.
LaCrosse, Mich., 7-8.
Lewiston, Idaho, 7-8-9.
Madison, Ind., 6-7-8.
Madison (Wis. H. S.), 7-8-9.
Manhattan, Kans., 7-8.
Manitowac, Wis., 8-9.
Mohnton, Penn., 7-8-9.
Muncie, Ind., 6-7-8.
Muskegon, Mich., 7-8-9.
Muskogee, Ok., 7-8-9.
Neodesha, Kan., 7-8-9.
New Kensington, Penn., 7-8-9.
Newton, Kan., 8.
Norwalk, Conn., 7-8-9.
Oakland, Cal., 7-8.
Ogden, Utah, 7-8-9.
Palo Alto, Cal., 7-8-9B.
Quincy, Ill., 7-8-9.
Rhinelander, Wis., 7-8. 9 later.
Richmond, Ind., 7-8.
Rochester, Minn., 7-8-9.
Salt Lake City, Utah, 7-8-9.
San Antonio, Tex., 8.
Santa Anna, Cal., 7-8.
Santa Rosa, Cal.
Seymour, Ind., 7-8.
Solvay, N. Y., 7-8. 9 later.
Topeka, Kan., 7-8. 9 later.
Trenton, N. J., 7-8-9-10.
Webster, N. D., 7-8-9.
Winfield, Kan., 7-8.
Worcester, Mass., 7-8.

Santa Rosa, Cal., Globe, Ariz., Ephrata, Penn., and Edgerton, Wis., have the last six years organized into the high school department.

In some of these cities the junior high school is being considered, while others will put it into operation next year.

Atlantic City, N. J.
Bayonne, N. J.
Beverly, Mass.
Camden, N. J.
Danville, Va.
East Orange, N. J.
Goshen, Ind.
Jackson, Mich.
Kansas City, Kan.
Little Rock, Ark.
Minot, N. D.
New Bedford, Mass.
Philadelphia, Penn.
Portland, Ore.
River Falls, Wis.
Roanoke, Va.
Saginaw (East), Mich.
Walla Walla, Wash.
Wichita, Kan.

San Francisco, Cal., Salina, Kan., and Ely, Minn., are partially organized. The department of education at the University of Wyoming maintains a six-year high school.

Reported as having the junior high school.

Anderson, Ind.
Arkansas City, Kan.
Aurora (West), Ill.
Boise, Idaho.
Clarksville, Tenn.
Cloquet, Minn.
Coffeyville, Kan.
Furgus Falls, Minn.
Gothenburg, Neb.
Horicon, Wis.
Hutchinson, Kan.
Jackson, Tenn.
Langdon, N. D.
McMinnville, Ore.
Malden, Mo.
Marion, Ind.
Pocatello, Idaho.
Santa Barbara, Cal.
Springfield, Ill.

The junior high school has been recommended as a result of the following surveys: Portland, Oregon; New York City; Boise, Idaho; Springfield, Illinois; Vermont; Butte, Montana. The National Association of State Universities has declared in favor of the plan as have the State Teachers' Associations of Washington, Oregon, Idaho, and Montana. There seems to be no question but that a great many schools will be organized upon this basis within the next few years.

Cities from the above lists having the junior college.

Aurora, Ill., 1 yr.
Columbia, Tenn., 1 yr.
Evansville, Ind., 2 yrs.
Fresno, Cal., 2 yrs.
Grand Rapids, Mich., 2 yrs.
Muskogee, Ok., 1 yr.

Contemplating this feature.

Austin, Minn.
Crawfordsville, Ind.
Curwensville, Penn.
Devil's Lake, N. D.
Neodesha, Kan.
Quincy, Ill.
Winfield, Kan.

It has been advocated at LaCrosse, and will probably be put in operation when the colleges and universities give credit for work done. Detroit would have one if it were not against the law. Bismarck will probably offer the first year next year. Worcester, Mass., Chanute, Kan., Trenton, N. J., Webster, N. D., and Faribault, Minn., reply "not at present," and Concord, N. H., is favorably disposed toward it.

The junior high school is a recent product. Twenty-two of the 68 schools reporting were established in 1914; 14 in 1913; 5 in 1912; 5 in 1911; 3 in 1910; and 2 in 1909. Columbus in 1909, Berkeley and Concord in 1910, and Los Angeles in 1911, are the ones usually referred to as the pioneers in the field. However, the movement was more or less under way prior to this, as Crawfordsville mentions 1907, Ogden 1909, and Madison, Indiana, 1908, as the time the readjustment began. Several cities had departmental teaching in the last grammar grades much earlier than this, and if not desig-

nated as a junior high school or an intermediate school, had many features of the present organization. Kalamazoo has had the seventh and eighth grades departmentalized for twenty-five years, Worcester since 1898, and Fresno, Muncie, and Fort Scott have had essentially their organization for a number of years.

Grades Found in Junior High School

The methods of grouping are due in a large measure to local conditions, but some prefer divisions other than the segregation of the seventh, eighth and ninth grades, although this is favored more than any other division. In some of the larger cities the idea is to arrange for junior high schools in different centers, a plan that obviates distance and allows any grouping that may be desired. In other places, however, the seventh and eighth grades, and possibly the ninth, are in the buildings with the lower classes. Oakland has one distinct junior high school, and another school that has grades six to ten, inclusive. Besides these, there are four large elementary schools in which the work of the seventh and eighth grades is organized on the junior plan. The latter schools have given such satisfaction thus far that the intention now is to gradually reorganize all the larger elementary schools on this plan.

Again, one plant may house the last six grades. An example of this is found in Evansville, Indiana, where the arrangement is not one of necessity, but of preference. The advantages of this arrangement are that it allows one teacher to work in any of the grades; and it reduces the feeling on the part of the pupils that there is any real division between the junior and senior schools. Rochester, Minnesota, is an example of this same grouping, but the superintendent is convinced that the plan would work out more successfully if the two schools could be separated.

Summarizing the actual conditions, there are 23 schools organized with the seventh and eighth grades in the junior high school, and 27 with the seventh, eighth and ninth. Various other groupings are found, but these are more frequently the result of local conditions. The larger cities prefer a separate building, but it is doubtful if this is the case in the smaller places. In a little less than one-third of the cases the junior high school has its own building, but in the majority of the cases it is found in the same building with the last three high school grades. About half the time it has its own principal, whether or not it is housed with the senior school, and in a little less than half the cases one principal

supervises the six grades. In a few places the junior school is in a building with the elementary classes with one principal for all; and in a few instances the junior principals are assistants to a principal of high schools.

Entrance Requirements

Probably one of the most fundamental reasons for the junior high school is that pupils may be given school work that they should have. The usual method of advancement in the grades is by promotion, which ordinarily means that a definite amount of work has been done, and a corresponding mark or promotion card given. The question has been raised whether or not past accomplishment, and especially the length of time actually spent in reaching a certain point in school, have any more significance than the physiological or psychological age, if as much. Moreover, it is well known that elimination occurs very frequently when the pupil reaches the age of fourteen, or thereabouts, and is two or more grades behind. It seems reasonable to expect, then, that superintendents would take this into account in admitting pupils to the junior high school.

One of the questions in the syllabus was: "Upon what do you make entrance to the junior high school depend?" The returns are as follows: 19 require "promotion"; 14 require "satisfactory completion" of preceding work; and 17 state definitely that factors other than the two just mentioned are taken into consideration. Superintendent Mackey, of Trenton, New Jersey, gives a reply that is typical of the last group: "Pupils who are regularly passed from the sixth to the seventh grade will be eligible to the junior school, and also all pupils, especially over-aged pupils, who are likely to get greater benefit from the course it offers than from the course open to them in other schools."

The Wisconsin High School makes practically no requirements as to previous work. An applicant is admitted if he possesses ability to read, write, and speak simple English with reasonable ease and accuracy; has good health; and is twelve years of age. Applicants under twelve receive special attention, and if they show a mental age of twelve years or above, they are admitted. Solvay, New York, has essentially the same requirements.

The following extract from the report of the survey of the Portland schools outlines a broad policy with regard to the placing of pupils:

"The most fundamental principle in this connection, is that instruction, both in content and in method, must be adapted to pupils' needs, to individual needs; not the instruction that a pupil has had,

but the instruction that he needs; not what a pupil has learned, but what he needs most to learn, must determine the placing of that pupil. Carried into actual practice, this means that when a pupil has reached in maturity and need the intermediate period, he is to be advanced to instruction appropriate to that period, whether he has completed the normal work of the elementary period or not; . . . Instruction must always fit the stage of development, even to the individual needs in that stage of development; elementary instruction is not suitable for children of the intermediate stage, nor is intermediate instruction suitable for youth of the secondary stage" (15, 164).

Enrolment Figures

School men have argued that with a different course of study, different requirements as to entrance, and a familiarity on the part of the pupils as to departmental teaching and other high school methods, a greater number would be held in school through the ninth grade and possibly through the entire course. Retardation and lack of interest as causes for elimination would in a large measure thus be met. Comparative figures as to failures under the old and the new plan could be obtained only in a very few instances, but these tend to show that there is less repetition under the new plan. Superintendents are practically unanimous in saying that there have been decided gains along this line. The increase in population, with many other factors contributing to increase the enrolment, makes it difficult to arrive at a fair conclusion as to what extent the junior high school has been operative in increasing attendance. The schools that have been reorganized within the last year have not had sufficient time to see what the results will be. Some superintendents, who have had the plan in operation a longer period, are not willing to attribute gains in enrolment to the reorganization, but in a majority of cases the junior high school is credited with being a powerful factor both in reducing the number of repeaters and in keeping pupils in school.

An attempt was made to secure enrolment figures for the seventh, eighth and ninth grades, and the total enrolment of the senior high school, under the new plan and under the old. The following summary shows comparisons made from data actually received:

Thirty-one schools show a loss of 17% from the seventh grade to the eighth grade. Ayres (2, 13) shows that the usual loss is 28.6%; Thorndike (17, 17), 32.5%.

Twenty-three schools show a loss of 20% from the eighth grade to the ninth; Ayres gives 28% as usual; Thorndike, 32.5%.

Twenty school systems show that the combined enrolment for the tenth, eleventh, and twelfth grades is 206% of the enrolment of the ninth grade. (These systems have the sev-

enth, eighth and ninth grades in the junior high school.) For each 1000 in the first grade, Ayres estimates that there are 189 in the ninth, 123 in the tenth, 81 in the eleventh, and 56 in the twelfth. For these figures, the combined enrolment of the tenth, eleventh and twelfth grades is 137% of the ninth.

The combined enrolment in 18 systems of the tenth, eleventh and twelfth grades is 63.3% of the enrolment of the seventh, eighth and ninth grades combined. (Seventh, eighth and ninth grades comprise the junior high school.) Ayres, 31.7%.

Thirteen school systems show that the total enrolment for the ninth, tenth, eleventh and twelfth grades is 251% of the eighth grade. (Seventh and eighth grades comprise junior high school.) Ayres, 171%.

Ten school systems show that the number of boys in the junior high school is 42% greater than it was under the old plan; and that the number of girls has increased 27%. The total increase in enrolment is 34%.

Fourteen school systems show an increase in the senior high school enrolment (both boys and girls) of 18%.

Thirty-nine cities enroll in the senior high school, a total of 18,514 students, of whom 45.6% are boys. Ayres gives 43% as the average percentage of boys.

Twelve cities show that the proportion of boys enrolled under the new plan is 1¼% more than under the old.

Los Angeles (not included in any of above figures).

Table showing the distribution in per cents of total enrolment:

	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
1910-11....	7.8	6.2	5.9	2.7	1.6	.8
1913-14....	7.7	7.7	4.9	3.0	2.1	1.5

	Grades 7-8-9	Grades 10-11-12
1910-11.....	19.9	5.1
1913-14.....	20.3	6.6

Courses of Study

Table showing junior high school courses. The subjects marked R are required; those marked E are elective; those marked O are found in the course, but may or may not be required. The notes on page 262 are explanatory of the table.

	Grades in Jr. H. S.	English	History	U. S. History	Arithmetic	Algebra	Mathematics	Civics	Geography	Commercial Geog.	Industrial Arts	Manual Training	Domestic Science	Mechanical Draw.	Commercial Arith.	Shorthand	Typewriting	Bookkeeping	Grammar	Penmanship	Spelling	Spanish	Latin	French	German	Art	Music	Drawing	General Science	Physiography	Phys. or Hygiene	Gymnasium
Columbia, Tenn.	7	R		R	R				R				E	E							R										R	
	8	R	R	R	R				R				E	E							R										R	
Columbus, O. See Notes 1, 3	7	O		O	O				O			O							O	O	O				O		O	O			O	O
	8	O		O			O	O	O			O							O	O	O		O		O		O	O			O	O
	9	O				O																	O		O			O	O	O		
Crookston, Minn. See Note 12	7	O		O	O				O	O		O	O						O	O	O											
	8	O		O	O					O		O	O	O	O				O	O	O											
Crawfordsville, Ind.	7	R		R	R				R			R	R							R	R					E	R				R	
	8	R		R	R				R			R	R							R	R				E	E	R				R	
Dayton, O.	9	O				O						O	O		O					O	O		O		O		O		O			O
Devil's Lake, N. D.	7	R		O	R			O	O			O	O						O	R												
	8	R		O	R			O	O			O	O						O	R									O			
Evansville, Ind.	8	R		R	R							R	R												E	E	E	O				E
	9	O	O				O	O				O	O		O			O					O		O	O	O	O	O			O

COURSES OF STUDY—*Continued*

	Grades in Jr. H. S.	English	History	U. S. History	Arithmetic	Algebra	Mathematics	Civics	Geography	Commercial Geog.	Industrial Arts	Manual Training	Domestic Science	Mechanical Draw.	Commercial Arith.	Shorthand	Typewriting	Bookkeeping	Grammar	Penmanship	Spelling	Spanish	Latin	French	German	Art	Music	Drawing	General Science	Physiography	Phys. or Hygiene	Gymnasium
Hays, Kan. See Note 3	7	O		O	O														O		O		E		E		R	R	O		R	R
	8	O	O		O	O		O				E	E								O		E		E		R	R	O		R	R
	9	O	O			O																	E		E		R	R		O	R	R
Kalamazoo, Mich. See Note 1	7	R		R	R				R			R								R	R						E	E	R		R	R
	8	R		R	R							E	E	E						R	R		E		E		E	E	E		R	R
Los Angeles, Cal. See Note 4	7	O		O	O				O			O	O	O		O	O	O		O		O	O	O	O	O	O	O				O
	8	O		O		O						O	O	O		O	O	O		O		O	O	O	O	O	O	O			O	O
	9	O	O			O						O	O	O	O	O	O	O		O		O	O	O	O	O	O	O		O		O
Lewiston, Idaho See Notes 1, 3, 5	7	R		R	R				R		E	E	E							R		E	E		E	E	R					R
	8	R		R			R	R			E	E	E									E	E		E	E	E		R			E
Wisconsin High School, (Madison) See Notes 1, 3, 13	7	R		R			R	R	R		E	E	E								R		E	E	E	E	E					R
	8	R		E			R		R		E	E	E										E	E	E	E	R		E			R
	9	R	E				E				E	E	E										E		E	E	R			E		R
Muskogee, Okla.	7	R		R	R				R			R	R							R						R						R
	8	R		R	R			R				R	R							R						R				R		R
	9	R				R						E	E									E	E		E							E
Neodesha, Kan.	7	R		R	R							R	R				E	E		R					E		E	E			R	
	8	R		R			R	R	R			E	E			E	E						E		E		E	E				
	9	R				E				E		E	E							E			E		E				E		E	

Oakland, Cal.	7	R		R	R				R			E									R		E	E	E	E		R	E	E			
See Notes 1, 3, 6	8	R		R	R			R	R			E					E				R		E	E	E	E		R	E	E		R	R
Rochester, Minn. See Notes 3, 7	7	R		R	R							E	E													E		E					E
	8	R							R		E	E	E	E				E		R	R				E		E					E
	9	R								E	E	E	E	E				E						E		E		E					E
Salt Lake City, Utah See Note 8	7	R			R				R			E	E						R	R	R		E	E	E		E	E				R
	8	R		R	R							E	E						R	R			E	E	E		E	E				R
	9	R				R													R		R		E	E	E					R		R
San Antonio, Tex.	7	R		R	R			R	R			R	R						R	R	R	E			E		R	R			R	R
	8	R		R	R			R	R			R	R						R	R	R	E			E		R	R			R	R
Solvay, N. Y. See Note 9	7	R		R	R			R				E	E				E											R	R			
	8	R		R	R			R				E	E				E	E							E			R	R			R
See Note 10	7	R		R			R	R	R			R					E					E	E	E	E			R			R	R
	8	R					R	R				R		E		E	E					E	E	E	E			R			R	R
	9	R	E				E					E	E	E	E	E	E	E				E	E	E	E				E		R	R
See Note 11 General Course	7	R		R	R				R			R	R			E	E	E		R		E	E	E	E		R	R				R
	8	R		R			E	R				R	R	E		E	E	E				E	E	E	E		R				E	R
	9	R	E			E						E	E		E	E	E	E				E	E	E	E		E		E			R
See Note 11 Commercial Course	7	R		R	R				R			E				R	R	R		R		E		E	E		E					R
	8	R		R				R				E				R	R	R		R		E		E	E		E				R	R
	9	R				E						E			R	R	R	R		E		E		E	E		E		E			R
See Note 11 Vocational Course	7	R		R	R				R			R	R			E	E	E		R		E		E	E		R	R				R
	8	R		E		E						R	R	R				E				E		E	E				R			R
	9	R	E			E						R	R	R				E				E		E	E				R			R

NOTES TO COURSES OF STUDY

1. Geography given with history.
2. Physical geography and general science run one-half year each.
3. Spelling; grammar; or spelling and writing with English.
4. Los Angeles offers: (1) A Literary-Scientific course, which leads to high school courses preparatory to colleges of letters and science; (2) Engineering preparatory, preparatory to high school courses in engineering; (3) Mechanic Arts, for boys mechanically inclined, who may or may not continue in school; (4) Home Economics, for girls who expect to become home makers, who may or may not continue in school; (5) Commercial, intended to prepare for the commercial course in high school, or to enter commercial work if they cannot continue in school. Different subjects are offered within the different courses, and electives are offered within the courses to a certain extent. Oral English is offered in the eighth and ninth in all the courses.
5. Lewiston, Idaho. "Beginning with the third junior year, all the work is elective except English. All work, however, must be elected by majors and minors. Five years' work is offered in Spanish, German and Latin and six years' work in shop work, which includes forging and actual construction work. Six years' high school work is offered in home economics. The senior high school industrial work for both boys and girls is made strongly vocational. Agriculture was introduced this year and two years' work is offered."
6. Oakland also offers Italian and nature study. Modern language is offered in the fifth and sixth grades in the University School.
7. Rochester, Minn., offers in addition to the subjects shown in the table: garment making in the seventh and dressmaking in the ninth; bench work in the seventh, furniture making and mechanical drawing in the eighth; mechanical drawing, carpentry and cabinet making in the eighth and ninth; and industrial history, harmony, and general agriculture, poultry and gardening in the ninth. These lines are carried through the tenth, eleventh, and twelfth grades in a very complete way.
8. Salt Lake City requires current events in all three years. Reading, writing, language, grammar and composition are given in the English courses.
9. Solvay, N. Y. "The work as we give it is divided into six separate courses. While often the same subjects may be required in every course, there may be considerable difference between the subject as given in one course and the same subject as given in another course. English, very similar to the elementary syllabus requirement, except that we teach less technical grammar, is given in the academic course in both the seventh and eighth grades, with still less technical grammar. English is required in the household and practical arts courses, and in the two vocational courses; but we give in these courses no technical grammar whatever. History in the academic course and commercial course follows the elementary syllabus requirements. History in the vocational courses, household and practical arts courses is much less complex, and gives more emphasis to inventions and commercial history. The study of commerce and industry (commercial geography) is rather similar throughout and is required in both seventh and eighth grades except in the vocational course, where it alternates with history. A wide divergence is found in arithmetic. The academic course takes commercial applications of percentage, but soon gets to treating it as algebra. They treat their mensuration as geometry. The commercial course spend all their time on commercial applications and arithmetic, particularly insisting on a high standard of accuracy and rapidity in computations. Drawing, too, differs between

the courses as does also the science work. The academic pupils all take German five times a week for two years. Commercial pupils take typewriting for two years, bookkeeping for one year. Household Arts pupils take two double periods of cooking and two double periods of sewing each week for two years. Practical arts pupils take four double periods a week of shop work and one double period of shop drawing for two years. The vocational pupils spend one-half of their time in practical work. The boys of the commercial and academic courses get one double period a week of shop work. The girls of these courses get one double period of cooking and one of sewing."

10. Course of study recommended for California schools, by Will C. Wood, Commissioner of Secondary Schools.

11. Outline of a general, a commercial, and a vocational course, recommended in the report of the commission that made a survey of the schools of Portland, Oregon. Subjects not shown in the table are freehand drawing, offered in the eighth and ninth grades of the general course; freehand drawing in the eighth and ninth years of the vocational course for girls. General science in the vocational course includes hygiene. In the ninth year in the vocational course elementary physics is the elementary science offered to boys and elementary chemistry for girls. Oral English is offered in the eighth and ninth years of all the courses.

12. Crookston, Minn., has academic, industrial and commercial courses in the junior high school. Subjects are differentiated as to courses.

13. The Wisconsin High School offers agriculture and biology in the ninth year. "As a further guide in the selection of studies, it should be clear at the outset that each pupil, beginning with the Fourth Class (the ninth grade), will be required to complete for graduation, in addition to the required English, at least three units of elective work in one of the following groups, and also at least one unit of elective work in at least two of the remaining groups: (A) History, (B) Mathematics, (C) Science, (D) Foreign Language. In deciding upon courses of study, pupils and parents are requested to keep in mind the general plan of the school. The six-year organization may, for guidance in arranging studies, be divided roughly into three two-year periods. At the beginning of each two-year period each pupil is permitted to make a new selection of studies in so far as changes desired are in agreement with the general requirements stated above. Within each two-year period the pupil's courses are relatively unchangeable. The aim is to map out at opportune times two-year courses in accordance with the best knowledge then available as to the pupil's capability and purpose. By this method the courses selected are intended to provide continued trial of a pupil's qualities, with a view to finding his best."

Courses of Study in Cities Not Included in the Table

Clinton, Ia., offers "(1) a High School Preparatory Course, for those who expect to continue their studies in high school after completing the ninth grade. For these pupils, three courses are offered —English, Latin, and German. But a pupil must be superior in his seventh grade work to have the option of entering upon a high school language study before the ninth grade. (2) A Vocational Course, for pupils who do not expect to continue in school longer than the ninth grade. For these pupils a full course in manual training for boys and a full course in home economics is offered for girls, two years in length. In the place of algebra, they are given industrial arithmetic and bookkeeping."

Norwalk, Conn. provides for "the differentiation of the work in the seventh, eighth and ninth years of the Junior School into well defined courses which continue throughout the Senior School. These courses are as follows: (1) Academic course, 6 years. (2) Commercial course, 2 years. (3) Commercial course, 6 years. (4) Manual Arts course, 6 years. (5) Manual Arts course, 2 years. Provision is made for continuation schools for those who cannot continue the regular work of the Junior School."

Trenton, N. J. "The plans for courses of study are not yet completed. We expect to have three courses of study that may be loosely classified as academic, commercial, and industrial or domestic. Some subjects in all these courses will be identical, and the electives will be mainly in the line of foreign language work for those who are to pursue the academic courses, commercial arithmetic, typewriting, bookkeeping, etc., for those electing the commercial course, and additional hours in shop and kitchen for boys or girls electing the industrial course. The fact that we have in this city a school of Industrial Art, supported by the city, has diverted to it from the public school pupils in most prevocational courses. Our Board is inclined to refer pupils to that school rather than amplify courses for them in the public schools."

Boston, Mass. "We have introduced into the seventh and eighth grades in all these districts the study of French or German. This work is optional with the pupils. The methods of teaching these subjects are distinctively oral or conversational type. It is confidently expected that most pupils who pursue either French or German for two years in the elementary grades will anticipate a full year of high school work, and receive credit therefor. We are studying how to correlate the work in English in the elementary grades with that of the high school. We find it more difficult here to anticipate high school work, but we are hopeful of completing arithmetic as such in six years; and that in the seventh and eighth grades we may teach mathematics. This mathematics includes arithmetic, very simple work in algebra and constructional geometry. Following this course, the first year mathematics in the high school should not be algebra, but should be mathematics, built upon the work in the grades. We are beginning to differentiate our work, and to segregate our pupils at the end of the sixth grade instead of at the end of the eighth. We hope eventually to have several courses beginning with the seventh grade which shall be offered to pupils—one for those who are to take cultural courses in the high schools, and another for those who are to take commercial work, and another for that heretofore neglected group of boys and girls who are compelled to enter the industrial or artisan world before, or at, the completion of the elementary school course. In our attempt at correlation we have had committees of high school teachers appointed to observe the work in modern languages and in English in the grades, to give suggestions relative to subject matter and methods, and finally to designate those districts where pupils do such work as to entitle them to advanced credits on entrance to the high schools. We call these classes at present Intermediate Classes, but we look forward to the time when we shall add to our seventh and eighth grades the ninth, or first year high school grade, and segregate these pupils in a building distinct from all the others. This is our interpretation of the junior high school which we eventually hope to establish."

The following is an extract from the report of the Com-

mittee on the Reorganization of the Public School system in Wisconsin.

"There seems to be quite general agreement that the common core of constants for the seventh and eighth grades in the new secondary school shall be: A. (1) English (with larger emphases upon literature suitable for adolescent development), Elementary Mathematics (including the simpler elements of observational Geometry and the algebraic treatment of the equation), and General Science—these three fields interlocked with History and Geography and so administered as to lead to more advanced courses in later years. (2) Some form of construction work for all pupils such as Manual Training, Domestic Science, Drawing or Agriculture, the latter so taught as 'to start with actual life for knowing and to come back to it for doing.' (3) Certain exercise in the form of music and physical education and other expressive activities required of all pupils.

"B. The zone of variables for the seventh and eighth grades depends upon the size of the school—the number of sections of pupils of the same grade. If two or more sections are found the choice of either a foreign language or commercial subjects may be given. Under some conditions the optional study may be given in extra assignment in constructive work. For the second cycle, the ninth and tenth grades: English and Mathematics are suggested for the prescribed studies. The optional field varies depending upon the size of the school. For the third cycle, the eleventh and twelfth grades: English, for at least three periods a week may constitute the only prescribed study.

"Bearing in mind the insistence of the committee that courses of study be selected with a view of pursuing them for a period of two years, it will be seen that a pupil's time and energy may be wisely distributed throughout the six-year system in the representative major fields of secondary education, English, Mathematics, History and Civics, Science, Language, and Constructive Activities, including Agriculture and Commercial Branches."

In the recent survey of education in Vermont it is advocated that the smaller high schools, that are with great difficulty and expense maintaining a four-year high school course, give up the last two years, and that they consolidate the seventh and eighth grades and the first two years of the high school "into a compact, closely articulated school unit, to be known possibly, as a junior or intermediate high school." A central school could then be organized in a sufficiently large district, open to and designed for the needs of the entire district. Its curriculum up through the junior school would be adapted to the needs of its immediate locality. The same would be true of the other schools in the district. Furthermore, this "course (in the junior high school) should represent acquirement and training of recognized value to such pupils as may receive no further education. Moreover, this value must be such as can be appreciated by the average parent, and to no slight degree, by the pupil himself. Second, the curriculum should be based predominately upon the environment and find its points of departure and return in community activities and needs. Third, the course must fit

in with the central school, through which the avenue to higher education must be kept open." (12, 100).

Features of Other School Systems

Some schools that do not have a regular junior high school organization are arranged in such a way as to include a part, if not all, of its advantages. Springfield, Mass., offers in the eighth and ninth grades, German and French to especially capable pupils and in the ninth grade all pupils take either commercial arithmetic or algebra, according to which high school they expect later to attend. Plans are now being made to introduce first year high school science into the ninth grades. All these subjects receive high school credit. Providence, R. I., has a separate school organized on the same principle. Pupils are selected on the basis of scholarship and prospects, for the special purpose of enabling those who are to continue in school and college to commence Latin and French earlier than the regular grades. Lincoln, Neb., has a preparatory school of much the same type. Pupils are selected for this school from all the sixth A and seventh B classes in the city, those being chosen whose records are the highest and who are physically as well as mentally capable. In this school they complete the seventh, eighth and ninth grades in two years, after which period of time they enter the second year of the regular high school.

Saginaw, Mich., has the departmental plan in the last two grammar grades, which are in separate schools. Charleston, S. C., has one high school of the eighth to twelfth grades, inclusive, while at Fort Worth, Texas, there is a separate school for the last half of the last grammar grade. The function of both these is to familiarize the student with high school methods and certain high school subjects before the regular high school is reached. It is thought that the latter organization would be improved if it were possible to take all the pupils in these schools through the entire seventh year.

Los Angeles High School Courses

Los Angeles High School. City High School District

Courses 1 to 6 inclusive are college preparatory, and prepare for the University of California, Stanford, and Eastern Colleges. Course 7 prepares for Mark Hopkins, Pratt Institute, and Chicago Institute of Art. Courses 8 and 9 prepare for Stanford.

1. College of Letters (Classical).
2. College of Social Science.
   a. Latin four years and Modern Language three years.
   b. Latin four years and Modern Language two years or English four years.

3. College of Natural Science and Agriculture.
4. College of Commerce.
5. College of Engineering and Chemistry.
6. Architecture.
7. Fine and Applied Arts.
8. Music.
9. General.
10. Elective Course.
11. Normal Courses for Playground Instructors.

Los Angeles Polytechnic High School

1. Commerce.
2. Home Economics.
3. Electrical Engineering.
4. Mineralogy.
5. Surveying.
6. Art.
7. Mechanical Draughting.
8. Architecture.
9. Music.
10. Industrial.
11. Dressmaking and Millinery.
12. Chemistry.
13. Mechanical Engineering.
14. General Elective.
15. College Preparatory.

Gardena Intermediate School and Gardena Agricultural High School

For seventh and eighth grades:

1. General Course.
2. Commercial Course.

For grades nine to twelve:

1. Agricultural Course.
2. Home Economic Course.
3. Literary Course.
4. Science and Mathematics Course.
5. Normal Preparatory.
6. Two-year Agricultural Course.
7. Two-year Commercial Course.

Vocational Aspects

The vocational aspect is receiving much attention, but there seems to be a great divergence of opinion as to what should be the general aim of industrial and domestic arts, and the like, with a corresponding difference in the courses offered. Out of 47 replies, manual and domestic arts are required in 19 cases, elective in 23 cases, and are required for one or two years in 5 cases. Thirteen reply that this course is planned for educative value only, 14 have the vocational guidance motive; and 20 have both these ideas more or less definitely in mind. Two cities—Salt Lake City and Norwalk—mention that they have made provision for vocational guidance under special directors. Lewiston gives credit for outside work, and at the Wisconsin High School one-half credit a year may be earned in "leisure hour pursuits."

Any of the junior courses that have been examined could possibly be grouped under one of the following headings: (1) A course consisting largely of the traditional subjects. (2) A course consisting of the traditional subjects, and some electives in addition. The electives are language (German and Latin most frequent), manual training or domestic science, and commercial subjects. This is the arrangement in many of the smaller places, and when language is elected forms the course in the larger cities for those pupils intending to enter the college preparatory course in the senior high school. Some require election by the group method, but no statement is made as to direction of choice in a majority. (3) A prevocational course, where there is more or less effort to prepare for a trade, but more frequently an attempt to guide the pupil in selecting his life's work, or to prepare for a vocational course in the senior school. (4) A vocational course, designed to fit for a trade or to prepare for home making. Here subjects are taught with direct reference to the particular vocation.

Features of Organization

The length of the school day and the length of the class period are other features wherein great variation is shown. The reaction towards the former, however, seems to be in favor of a longer day for both the junior and the senior schools. The length of the recitation period in the junior school varies from twenty-five to forty-two minutes, with quite a percentage having thirty-five or forty minute periods. All but about fifteen per cent report more or less supervised study, exclusive of the general study hall. Seventeen schools have periods of approximately one hour, with a part of the time devoted to the recitation, and the remaining time devoted to study under the direction of the teacher to whom the pupil has just recited. This helps to individualize the work by allowing the teacher to become more acquainted with the pupil's needs, and to learn the pupil better.

On the other hand, a forty-minute period has been found by some to be too long for pupils of this age. Commissioner Wood, of California, states that in his judgment "the course of study in the intermediate school should make adequate provision for study, and especially for periods when the pupil can be taught how to study. The program should be arranged so that the pupil may study a part of the time in the classroom under the direction of the teacher of the subject. Viewed from an educational standpoint, I think it is a mistake to expect too much home study from pupils of the

seventh and eighth grades. Again, I seriously question whether the forty-minute period is not too long for sustained attention in the case of seventh and eighth year pupils. In view of these facts, I suggest the division of the school day into eight 35-minute periods and one 25-minute period." The school day suggested by Mr. Wood runs from nine to half-past three, with a ten-minute recess at the end of the third period, and an hour noon recess.

Classes are of necessity segregated in industrial subjects, but separation other than this or in physiology and gymnasium classes exists only in a very few of these schools. Fresno and Santa Rosa, California, Detroit, and Chanute, Kansas, have classes segregated as to sex; and Richmond, Indiana, has the sexes separated in the study hall. In Clinton, Iowa, the boys and girls in the junior high school are organized into separate classes, and they also assemble in separate assembly rooms. "The purpose of this primarily is for convenience in making the program for the vocational work. There is another purpose in this separation of boys from girls, and that is to give the girls in the eighth grade arithmetic a different class of work which will be better suited to their needs in life; likewise, to the boys, more work along the line of commercial and industrial arithmetic. Besides, so far as we are able to, we expect to give them a different class of reading along the line of extensive reading, which will be selected with reference to their pursuits in life."

Manitowac, Wisconsin, has some classes grouped according to ability shown in a subject, and Evansville, Indiana, has classes grouped as to physiological age. Hackensack, New Jersey, has special classes for girls in physics and chemistry, and as far as possible, pupils who are now preparing for college are grouped in separate classes.

That there are certain advantages in segregation as to sex, especially during early adolescence, will hardly be denied. On the other hand, there are certain disadvantages, of which the chief one is possibly that it has not been feasible to provide two sets of buildings and equipment. With the concentration of larger numbers of pupils in one building and departmental instruction, it would seem that more experiments could be tried in segregation. If advantages are found similar to those already reported from experiments in this field, many of the benefits of segregation could be gained, and the old difficulty of providing additional facilities could be escaped (1, 733).

Reference has already been made to classification as to grade through methods other than promotion. In one or two cases the physiological or psychological age, as indicated

roughly by chronological age, seemed to be the criterion. More experiments are needed in order that the benefits from such a classification may be definitely determined, but it is probably true that too much attention is given to age as measured by years. Crampton (6, 237), in studying the anatomical age together with the chronological age as factors in determining a pupil's general reaction to the curriculum, reached the conclusions that children in the grades who have reached the adolescent age should be given work that will directly prepare them for immediately taking part in active life; that adolescents and pre-adolescents should be kept in separate classes; and that all observations, records and investigations of children should be based fundamentally upon physiological age. Foster (7, 88) found that when boys were grouped in classes according to physiological age they were more efficient. He is of the opinion that the increased efficiency is due to pleasanter associations in mingling with students of the same mental characteristics.

Patrons, Students, and Teachers

Superintendents are practically unanimous in asserting that there is added interest on the part of patrons. They are unanimous in saying that teachers and students favor the new plan over the old. Superintendent Johnson, of Rochester, Minnesota, found that out of 205 students 202 gave various reasons for preferring the reorganized school. Superintendent Study, of Neodesha, Kansas, found through the questionnaire method that both students and patrons were strongly in favor of the change.

Action of Colleges and Universities

A question of the syllabus was intended to find whether or not in the opinion of superintendents the institutions of higher learning favored the junior organization. Twenty-eight replies were received, leaving 40 that did not answer. One anticipates some opposition on the part of the colleges; 3 state that the professors of education favor it; 4 reply that as far as they have learned these institutions are favorable; 10 give a direct affirmative; and 10 give answers to the effect that no opinion has been expressed. Furthermore, nearly all of these affirmatives come from four states. From these figures it might be fair to assume that for the most part the colleges and universities, while not opposing the movement, are not coöperating very extensively.

Leland Stanford and the University of California favor the movement, and are recognizing the work done in the junior

colleges in that state. Oklahoma University makes a like provision for work done in the Muskogee school system, which is the only one in that state from which returns were received. The departments of education at Wisconsin and Wyoming Universities maintain a six-year high school. The school officers of the states of California and New Jersey are active in promoting the movement, while the indications are that a number of state departments of public education are preparing to lend encouragement.

The work in the secondary education field of the department of education at the University of Illinois is well known. Moreover, this institution has recently given official recognition to work done in junior colleges. Certain specifications are made with reference to students admitted to the junior college, qualifications of instructors and their teaching schedule, organization of courses, and equipment. In places where these qualifications are "approximately met, substantially hour for hour credit will be given at the time of the student's admission to the University, provided the maximum credit allowed shall not exceed 18 hours per semester." Partial credit will be given if the requirements are partially met. At present three high schools in Illinois, the Crane Technical High School of Chicago, the Lane Technical High School of Chicago, and the Township High School at Joliet, have the first two college years. The principals of these high schools and Superintendent Young have expressed their acceptance and approval of the proposed standards and regulations.

The University of Michigan has officially encouraged the proposition to reorganize the public school course on the six-three-three basis. A committee of the faculty presented a set of resolutions that were adopted by the university and later by the board of regents. The resolutions are as follows:

"1. That school authorities be encouraged to incorporate the seventh and eighth grades of the elementary school as an integral part of the high school system, forming a six-year system.

"2. That school authorities be recommended to organize the six-year high school system into a Junior High School of three years and a Senior High School of three years as soon as local conditions will admit.

"3. That graduates of the six-year high school course be required to gain during the last three years, at least eight of the fifteen units required for admission, two of which units shall be obtained during the senior year.

"4. That graduates of the six-year high school courses be permitted to apply for university credit on examination.

"Resolved, that students entering the University from a junior college, organized as a part of a city school system, may apply for admission on advanced standing, provided the course of study and the faculty meet the approval of the University."

Weak Points

Sufficient time has not elapsed to discover many of the weak points, for some will be found when the system is thoroughly tried out. As it is, features that appear a source of danger to some, are looked upon by others as desirable. The question has been raised as to whether or not the psychological basis underlying departmental work is so thoroughly proved as is sometimes claimed. The difficulties of the elective system have begun to be evident, and there is danger that pupils will begin to specialize at an age when they are not capable of making an intelligent selection. Bagley (2a, 4) thinks it probable that, with the differentiation of curricula beginning with the seventh grade, large numbers of pupils will escape training that ought to be common to all. He is of the opinion that this may lead to social stratification. Judd (10b, 28), on the other hand, does not share this view. Again, all are not convinced that the traditional subjects are not needed, and there is a feeling that a shorter time in the elementary school will mean still less scholarship on the part of high school graduates, which is thought to be of an inferior quality at present (13, 112).

Providing adequate buildings is a hindrance to some, although this feature seems to be of lesser importance and is often worked for an advantage. In more populous centers the establishment of a separate school often means a greater distance for children to go. Parents have sometimes sent their children to the elementary school rather than to a junior school, which was more distant. This tendency may prove a disadvantage in case different types of junior schools are established, for even regular high school students are prone to attend the school that is most convenient.

The six-three-three division has the most points in its favor, but a division ending with the tenth school year presents an advantage not found in a junior or intermediate school embodying grades seven, eight and nine. The course of study for the tenth grade as the beginning of the senior high school would very likely differ from that of the tenth grade as marking the end of a more or less definite cycle of school work, even in those schools where it is hoped that the line of demarcation between the junior and senior schools will be little noticed. On the other hand, a large number of cities are preparing vocational courses that are to end with the ninth school year, and for that large body of students who withdraw from school at the age of sixteen, a course ending with the tenth grade would better meet the needs (14, 133).

Perhaps the problem of greatest importance lies in securing

the right sort of teachers. Higher qualifications will be necessary, with corresponding increases in salary, for it is conceded that the ablest teachers should be placed in this division of the school. A greater percentage of men teachers is desired, and men for the vocational branches are demanded. Teachers qualified to conduct recitations in foreign language through the conversational method are hard to procure. It is undoubtedly true that the quality of instruction now sought is the same that should always have been provided, but added expense on the part of the schools frequently brings more or less objection.

The development of the junior college will also bring the teacher problem, as well as others of its own, the chief of which seems to be that there will be a tendency to offer an additional two years of work similar to the academic course of the high schools. While this will be of value to a certain class, there are the other classes of students that need work that is more vocational in nature which will be more difficult to provide. The indications are that the junior college will be established in places of lesser resources and school population where an inferior quality of work will be done. This, however, the entrance requirements of the colleges and universities will tend to correct.

Summary

1. The junior or intermediate school is in actual operation in 68 school systems. Reports consulted indicate that it is in operation in 19 other school systems; and it has been considered in 18 additional school systems.

2. A large percentage of the cities that have the junior high school have adopted the plan within the last two years.

3. Twenty-three systems are organized with the seventh and eighth grades forming the junior high school, and 27 with the seventh, eighth and ninth. The latter grouping seems to be preferred.

4. Two-thirds of the superintendents require promotion or satisfactory completion of the preceding grade as the entrance requirement to the junior high school. This indicates that little attention is being given to physiological age as a basis for classification of pupils.

5. A comparison of enrolment figures seems to indicate that the junior high school is a factor in increasing attendance. Superintendents are of the opinion that it also reduces the number of repeaters, or failures.

6. Courses that may be loosely termed vocational, prevocational, classical, and general, are being prepared for junior or intermediate pupils.

7. There is need for experiments along the line of segregation as to sex and classification as to physiological age. These features, if valuable, could probably be adopted to a large extent in the high schools.

8. Comparatively few of the colleges and universities and state school officials are coöperating in the establishment of junior high schools.

9. At present the weak points of the junior high school seem to be: Narrow specialization on the part of immature students; and lack of the right sort of teachers.

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THE MEDIAEVAL UNIVERSITIES AND SOME OF THEIR LESSONS FOR US[1]

By G. Stanley Hall

Your Eminences, Most Reverend and Right Reverend Bishops, Reverend Fathers, Delegates from Other Universities, Ladies and Gentlemen:

As a fellow-member with you of the Association of American Universities, permit me first of all to express the most hearty "*vivat, crescat, floreat,*" which I know all of them feel to the Catholic University of America on this most auspicious completion of the first quarter centenary of its existence, to congratulate you all on its signal achievements in the past, and to express the most earnest hope and prayer that each future generation *in saecula saeculorum* may be marked by a progress of which both you and our country will be no less proud than to-day. As we see war deepening old and arousing new antagonisms in Europe, should we not solemnly resolve that no divergencies of race, belief or interest, however great, shall ever have the power to rupture the bonds of mutual toleration and amity in our own land, and that the eternal peace of God shall be henceforth ever more firmly established among us all?

My theme is "Some Lessons which the Mediaeval Universities Have for Our Own." Only since the epoch-making publication of the Vatican archivist, Denifle, thirty years ago, has it been possible to realize the magnitude of our indebtedness to these institutions which began so humbly and obscurely in the twelfth century, but which grew and multiplied so fast that no less than fifty-five of them were established, thirty-one by popes and twenty-three by Christian princes, more than a century before the discovery of America. In 1553, sixty-one years after the first landfall of Columbus on the shores of the new continent, the University of Mexico was founded with three faculties, eighty-three years before Harvard, so that this, which has been called the last of mediaeval, is also the first of American universities. For decades the best of them had smaller funds and a poorer

[1] An address delivered at the twenty-fifth anniversary of the Catholic University of America, April 15, 1915.

independent housing of their own than the weakest of the five hundred and thirteen accredited universities and colleges in this country to-day. But such was the ardor and enthusiasm of teachers and taught, that if ever there was a university invisible, not made with hands, it was found in each of the three type universities, Bologna, Paris and Oxford, for these were most widely copied.

I. *In general* they were in no sense fiat institutions, made by bulls, edicts or millionaires, but grew inevitably out of the inmost needs of the times. The middle ages had a veritable genius for organizing life and for creating institutions, and it would be hard indeed to name a single general feature of student life, good or bad, a method of teaching or learning, wise or otherwise, an item of organization or control, a theme of rule or statute, or even a form of conferring degrees, of academic festivity or costume, anywhere in the world to-day that did not originate before the close of the fourteenth century. Fondly fostered as they were, first by the church and then by the state, richly endowed as they were with privileges and immunities, so lush was their growth, that all the specifications of their charters and constitutions usually only confirmed an already developed status. The term university, then applied to all corporations, had for a long time no relation to the universality of knowledge, and the aggregations of students in these *studia generalia* were essentially guilds. Altogether they were as characteristic creations of their day as were feudalism, trial by jury, parliament, or a constitutional king. These universities and the immediate products of their work constitute, in the language of Rashdall, "the great achievement of the middle ages."

Their effect upon the progress of Europe, too, was without precedent and probably can never be paralleled again. Theology, scholastic philosophy, law, civil and canon, the dawn of modern science, and the renaissance of the twelfth century, and to some extent that of the fifteenth, are essentially their work. Although the number of students that flocked to the largest of them has been exaggerated, nowhere probably exceeding eight or nine thousand, and although there always were dreamers, dawdlers and sometimes roughs among them, the outburst of intellectual ardor which they represent was on the whole also without precedent. Their vital relations with the church gave to learning an element of consecration it had never known before or since, so that their lessons should be known and laid to heart by all concerned with either the technique or the philosophy of higher education today. They are full of all the charm and freshness of the *juventus mundi academici,* they were an academic paradise.

As imperial Rome tottered and fell, Saint Augustine, whom Harnack calls the greatest personal influence between Saint Paul and the sixteenth century, supplied a surrogate to it in his splendid vision of a new spiritual kingdom of God or a theocratic state. So when the four great schools of classical antiquity, that had lasted a thousand years, dwindled and were closed by the edict of Justinian (529 A. D.), the stupendous problem of reorganizing and reconstructing Europe, submerged by wave after wave of barbarian invasion (340-450 A. D. being the century of migration *par excellence*), devolved upon the new religion working through the church and state. Its silent work of organization never ceased, and universities perhaps deserve to be called its chief instrument to that end.

(a) One of its original creations, unknown in antiquity, was a curriculum or a more or less standardized course of study, by which knowledge was both systematized and graded, and thus the seven liberal arts of the *trivium* and *quadrivium*, which held sway for a millennium, were evolved. To create a good course of study requires the very acme of pedagogic sagacity and statesmanship and makes for enormous economies of effort. A curriculum is a *vade mecum* with which to thrid the mazes of knowledges and skills. It seeks to designate in natural sequence the essentials and it saves from byways, from wastage of time and effort, and from second-rate sources. It is a trunk line carefully surveyed and facilitated to a maximum of efficiency in attaining a goal. The university only developed higher courses with new material on the basis of the seven muses of Capella.

(b) Again, the very idea of examination was new in the world, and the right to examine and pronounce results was never abandoned, even in those periods and institutions where the professorate was stripped of nearly all its other prerogatives. To measure up the knowledge attained at each stage of progress toward a goal, and also, if more incidentally, to calibrate ability, was not only a new but a splendid stimulus. Although standards changed and there were occasionally traces of venality, on the whole the examination was an ordeal so serious that at certain times and places relatively few attempted it.

(c) The degree was a third new creation. It was like a patent of academic nobility, accessible to all of whatever rank or station who could meet its requirements. It brought distinction, privileges and immunities, and master, and later bachelor, were common name prefixes, like doctor with us. As it was a trait of the Roman law to formally inaugurate into every office, so the conferring of degrees became not only a

very festive but also to the candidate a very expensive as well as elaborate ceremony, in which he was given an open book, a ring, and a hood, while he knelt, and then an embrace, a kiss and a benediction in the name of the Holy Trinity. Only after this was the scholar a full member of the academic guild, and feasting and jubilation followed.

(d) Again, the organization of teachers and learners of different departments into a single institution was another new thing in the world. This made for breadth of view, gave wholesome emulation and interaction, made for comparison and correlation of different branches of knowledge, and brought the organic unity which helps men to feel that the world is not a chaos but a cosmos with a spiritual unity behind it.

Universal and matter-of-course as this quaternian of agencies now is, it first came into existence in the Occident only five or six centuries ago, and constitutes the first specific bequest of mediaeval universities to us. If the institution of this new machinery involved any loss of the spontaneity which marked the culture of classical antiquity, if it has sometimes brought over-conservatism and even retardation, it has more than made up for all this by increasing historic continuity, by diffusing knowledge, by preventing a decline from culture once acquired, by keeping experts together, which latter is one of the best conditions of research, and by invitations to them to make new original additions to the sum of human knowledge.

II. *As to students,* they might enter, as many did, in the early teens, with small attainments save Latin, which was indispensable, and this was tested informally only by the oral questions and answers involved in matriculation. Very few could obtain any degree in less than seven years, and for this the tests were, with occasional exceptions, so severe that many never attempted them, a condition happily reversing our present methods of hard entrance and easy graduation.

At Paris in the fourteenth century most of the daylight hours were occupied by lectures, often two hours long, no small part of which was dictation for all instruction was oral, for students had little access to books but had to make them. There were other stated exercises, including those attending the two stated meals at ten and six, while early evening was a time of freedom and often of trouble. At first students often sat in the straw on the floor, for some thought this made for the humility and docility proper to the *status pupillaris,* although benches and still later desks came into general use.

As to comforts and hardships, candles and fires were too costly for individual rooms, and there was no glass for windows. From two to four pounds of meat could be bought at Oxford for a penny, and it was possible for a student to live on from seven pence to two shillings per week. Amusements were few, and the statutes called play with bat and ball "insolent" and tennis was "indecent." Chess was forbidden on legible days, and the only athletics were scuffling with each other and perhaps fighting with the people of the town. There were occasional riots and some vice such as Birdseye has shown on the dark side of student life to-day. Penalism or fagging of younger to older students was rife. Discipline, authority, control, which were notably lacking at first, developed apace, so that the occasional floggings of the youthful university students which we read of in the beginning, were soon superseded by fines, but only as the halls developed were students really subjected.

Youth is always gregarious, from the age of the street gang, so like the savage tribe, up, and of this instinct in adolescent years mediaeval universities furnish the world its very best illustration. The students at once organized themselves into nations, under a rector chosen from their own number and given unlimited power, whom they characteristically obeyed as unresistingly as a modern athletic team does its captain or coach, deposing him as summarily if things went wrong. Sheldon has shown the genetic connection between these organizations and the later *Landsmannschaften* and corps, etc., of the German universities, and even fraternities and other student societies of to-day. At the law university of Bologna, where attendants were older, (from eighteen to forty), wealthier and often beneficed or titled, students came to employ their professors on annual tenures prescribing just what puncta of the Pandects they should cover each day, fining them if they shirked a knotty point, binding them by oath not to accept a call to teach elsewhere, forbidding them to leave town without their permission, compelling them to begin and stop on the stroke of the bell, and not to lecture unless there were at least five students, and robbing them of nearly every prerogative save the one to which they clung through many a struggle, that of testing by examinations, and determining whom and how to promote to degrees. This student republic in an age of authority in church and state was thus the diametrical opposite of the unprecedented concentration of power in the hands of the American university president, which reached its acme in the days following the foundations of Cornell, Hopkins, Stanford and Chicago in this democratic land, which was necessary

under such conditions which Cattell and others here now object to, but which is now happily on the wane, deans and head professors now exerting the arbitrary power that presidents did a decade or two ago. But at Bologna, on the whole, at its best, standards of both teaching and learning were probably kept on the highest mediaeval plane. Throughout the entire pre-Reformation period the church stood for academic freedom, and in many a contest, culminating in the long struggles between the University of Paris and the Chancellor of Notre Dame, Rome decided against its own local dignitaries in favor of university independence and autonomy, and in a great majority of the many appeals made to her she sided with the professorate, and even with the students, against counter-appeals from both spiritual and temporal authorities.

For centuries a favorite method of government was by exacting oaths. All were sworn to obey every old and every new statute, to attend lectures, be punctual, pay debts, not cheat or bribe at examinations, and instead of the roll-call at each lecture, students had to swear at the beginning that they would and at the end that they had attended. In some cases there were over forty distinct oaths. Such was the horror of perjury and its penalties that this was long effective, but as oaths continued to multiply it was impossible either to keep them or to learn by elaborate espionage whether they had been broken. If our honor system has historic roots they are here, and at any rate this historic chapter has both its lessons and its warnings for us. Slowly fines came to take the place of oaths as more effective.

We have the beginnings of university extension in the early and common difference between ordinary and extraordinary instructors, hours, topics and books. Doctors and masters taught in the morning hours, in academic rooms, where there were any, the standard topics, and used the most classic texts, while the probationary teaching of intending masters and bachelors and all the work of *repetiteurs,* drill-masters and cursory readings took the second place, and a system of assistants and apprentices, to whom the professors delegated more and more of their work, grew, and all such courses were often given outside academic walls. It was these men at the larger that constituted the waiting list for appointments in the smaller universities. Some of them taught on for many years with no higher degree, so that we have here also the beginning of the docent system, which has lately become such a burning problem in German institutions, in many of which they have outnumbered the full professors, sometimes almost

revolutionizing old statutes and precedents in quest of their rights.

Academic vestments, too, can be traced back with considerable continuity to the original cappa, toga and baretta, of the fourteenth century, where these were mentioned in many a regulation, and were absent at first but came to be required of all. They were of course of ecclesiastical origin. Students were commanded to avoid gaudy lay dress, such as pointed shoes, trunk hose, bright colors, ornaments, also daggers and firearms. The pleat down the back of the standard academic hood to-day was once a veritable hood to be drawn over the head, while the rudimentary pocket in it is what is left of the pouch in which the mediaeval student carried his breakfast or lunch. The costume meant both distinction and immunity.

The induction of new students by older ones, by weird and often cruel rites, Specht traces back to student customs of classical antiquity, but they have perhaps never been so elaborate or rubricized as in the middle ages. The newcomer was bullied, hoaxed, badgered, hazed, robbed, mulcted, without stint. He was a tenderfoot, fledgling or beganus, a wild beast with horns that had to be sawed off, as his ears must be symbolically clipped. He was washed, barbered, fumigated, forced to confess preposterous crimes, and sometimes ceremonially buried and resurrected. In the Italian universities the freshman was more often a criminal, who was arrested, tried, condemned, sentenced, punished, and sometimes executed, while in the whole system of penalism he was subjected to all the whims and abuses of an older student. Always, however, having finished his purgation, his hardships and his servility end, and he is welcomed with great rejoicing into complete membership in the confraternity, and if the insults and outrages he has suffered rankle in his memory, he can find sweet recompense in inflicting all these indignities on younger men. If we compare all this with Sheldon's compilation of student customs in this day and land, we shall be struck with the ultra-conservatism and the utter lack of originality on the part of modern students in this field. These inductions into studentship show a very close parallel to the ceremonies with which nearly all savage tribes induct their pubescent youth into manhood and membership of the tribe. Indeed, these ceremonies touch one of the profoundest themes in psychology, which has countless outcrops in the ancient cults of Dionysius, Apollo, Attis, Osiris, and a score more. The modulus of every romance and drama is to subject the hero to a series of severe trials that tax his energy to the

utmost, almost to the breaking point, and then in the end to bring triumphant success, pleasure and relaxation of effort. By thus cadencing the soul and regulating alternations between pleasure and pain, the sovereign masters, we sanify, normalize, give elasticity, power of rebound, to life. The utmost strain, effort, danger, is succeeded by the greatest relief and perhaps ecstatic happiness. Now all this goes back to the death of nature in the fall and its resurrection in the spring. From these old winter-spring festivals up to the passion history, which is the world's masterpiece, man has been striving to safeguard his own nature, to spur the rising generation upward on the "excelsior" path of escape from the depressing sense of inferiority, and to make the very most and best of himself. These great rhythms give the soul an immunity-bath against the two chief dangers which modern psychiatry shows beset its sanity, viz.: being overwhelmed by pain or else inebriated with joy. These alternations not only give the soul unity against all forms of dual personality, but serve as the Aristotelian katharsis, for they make for elasticity, impel to both effort and control, and best of all, they sublimate and safeguard from passion and unfold the higher powers of man. Thus there is a sense in which the whole secret of education consists in administering aright these great rhythms, for education began with pubic rites, which always followed the formula pain-joy, and has spread up and down the age scale as civilization advanced. Thus we have a point of vital contact between religion and the higher culture.

The earliest form of spontaneous public benefaction to universities was not gifts to faculties or administration but to students. In the fourteenth, and occasionally in the thirteenth century, pious donors began to establish small funds for poor but deserving students. Some specified that the beneficiary should come from his own family, province, town, or have prepared at a specified school, or in some way give proof of ability, intend to enter clerical or some other profession. Some of these funds were very small and provided only lodgings, clothing, free beds in hospitals, books, firewood, and occasionally free meals, and along with these came the larger gifts for halls in which students first could, and then must, live. These foundations, *bursae,* stipends, are often pathetic illustrations of public sympathy with able young men who are indeed the light and hope of the world, most of all worthy of devotion and service by their elders. In this youth of our modern world, young men who sought the pearl of academic wisdom appealed profoundly to the instincts of the higher parenthood of their age. Baumgart fills a large volume with these ancient and often quaint provisions for facilitating stu-

dents in Germany. Leipzig, for instance, has to-day nearly 400 distinct funds, the oldest established in 1325, and all together providing for 729 students. The Oxford colleges have 367 of them, besides 480 scholarships, and 129 exhibitions. They abounded in France till the legislation of Turgot swept them all away in order that the state might appropriate special funds to such students and thus gather to itself their gratitude, while in Great Britain the principle of *cy-pres* has been so applied as to relieve many of these funds from the often absurd conditions of the dead hand. In this country I make 270 paying graduate fellowships, disregarding those purely collegiate.

Thus in Europe to-day many a student career is made possible by gifts of those who four or five centuries ago believed with the Parliamentary Commission who, at the close of their investigation of many thousand ancient bequests in Great Britain, declared in substance that charities devoted to this purpose probably had done church, state, and the world in general on the whole greater good than any other form of benefaction.

The emperors of ancient Rome gave special privileges to teachers and scholars, and in 1158 the first of those in the middle ages was granted by Frederick Barbarossa, exempting from attacks or extortion all students going to or returning home from the university, on pain of a brand of infamy and fourfold restitution. In 1200, as the result of a tavern brawl between town and gown, the Provost of Paris was commanded by the King to swear loyalty to students, and they were given a charter of exemption from civil court jurisdiction and supplied with a court of their own. In the same year all chattels of students were exempt from seizure by the civil power, for whatever cause. Students must not be interfered with on any pretext, and every plaintiff against them must appear before the university court, and even church courts could not try students save in the university town. Then came exemption from taxes, not only of all academic property but usually from all taxes whatever, either by masters or students or even subordinate officials. In 1231 Pope Gregory IX conferred one of the choicest of university privileges, viz., that of suspending lectures. This involved not only sealing up the fountains of wisdom but often a still more dreaded withdrawal of the university to another city, as indeed often occurred. The King of England in 1229 invited the University of Paris, when it happened to be in revolt, to migrate to his country, but the very threat of secession usually brought town authorities to terms and often to their knees. Another choice privilege granted to the masters and scholars was the *jus ubique legendi*

first granted by the papal bull in 1292, a privilege persistently sought by and often extended to other larger universities. This authorized the holder to teach without further tests in any university in the world. Cities also sometimes lavished universities within their bounds with privileges. They paid professors' salaries, exempted them from all kinds of rates and from all civic duties, appointed money lenders for students at about a fourth of the usual interest.

III. *As to work and studies* (a) the oldest mediaeval university, dating back to the tenth and possibly the ninth century, at the yet older health resort of Salerno, was devoted entirely to medicine, as Montpellier was in large part later. Here we find many of the germs of science, and its original ideal was expressed in the sentence of Hippocrates, "God-like is the physician who is also a natural philosopher." To a basis of ancient empirical tradition and practice, Hippocrates and Galen added their epitomes of the therapeutic experience of classical antiquity, and third and later there came from Saracen and Jewish sources the mystic elements of astrology, the parent of astronomy, and alchemy, the parent of chemistry, along with many new remedies, all of which Sprengel's monumental work has used to make the story of the dawn of medicine a fascinating chapter in culture history. Logic and mathematics were propadeutics, and much dialectic energy was devoted to giving the medical canon systematic form. After a long struggle with the popular horror of mutilating the human cadaver, not unlike that now against controlled vivisection, the dissection of one male corpse, fresh from the hangman, often in the churchyard, was permitted once a year. As first-hand knowledge of the body increased with growing liberality in the anatomy acts, the old texts were found not infallible, and when in 1482 laymen and even women students could finish the six years' medical course and receive degrees, and a little later Vesalius and then Harvey made an end of the old methodism, humoralism, iatrism, etc., the foundations of modern medicine were laid. Of course the texts and the knowledge of that day are long since transcended, but these pioneer medical schools were from the start far in advance of anything the Orient ever knew. At every period they represented the best medical thought and knowledge that then existed in the world, and what is better yet, they supplied the impulses that have issued in the best we have to-day. Their errors and even superstitions involved a profound and wholesome sense of man's inner union with nature. It was their work that made the great Vienna surgeon, Billroth, plead for a required course in the history of medicine in every institu-

tion for the training of the modern physician, and such a text Heser sought to supply. Not only medicine but biological science owes to this type of mediaeval university a far greater debt than it has yet realized.

(b) The chief secular problem of the middle ages was to reorganize business, government and society. We seek only to improve to-day what they created almost *de novo*. Their chief instrument to this end, as Savigny has best shown us, was Roman law. Deeds and contracts, courts and judicial procedure, inheritance and succession, corporations and charters, the status and rights of the various social classes, the kinds and functions of officials, taxation, crime—all had to be provided for. Besides the codex of Justinian in twelve books, which was at first all that was known, there came a little later the fifty books of the Pandects, digesting the results of fourteen centuries of legal experience, unknown till Irnerius introduced them at Bologna in the twelfth century, and thus created anew for the modern world the profession of law, which henceforth was taught, not as a branch of rhetoric as before, but as a vocation requiring long and special study by itself. Henceforth we are told "law was the leading faculty in by far the greatest number of mediaeval universities for more than five centuries." The practical effect of this upon European history and the progress of civilization is incalculable. The law universities recurriculized the law more efficiently than had been done in the *Institutes* or other ancient text-books, and nothing was more congenial to the unique instinct for organization of the mediaeval mind than this written reason or Organon of economic and sociological statecraft. More systematic and comprehensive than many codifications of modern laws, it is still taught beside them in most European countries. We even find here traces of the case system. Even the constitution and statutes of the mediaeval, and in many respects those of the modern, French and English university are based on Roman law.

(c) The very year of Abelard's death, 1142, Gratian, inspired by the impulse of the Roman civil law jurisprudence, published another of the great text-books which "took the world by storm," and which became the solid basis of the great superstructure of canon law. The church had already a vast body of decrees, edicts, statutes, decisions of councils and officials, modes of ecclesiastical government, internal and external, laying down the relations between spiritual and temporal authority, comparing Christian and classical culture, specifying the requirements and training for different officials. As Augustine's lofty vision of the city of God had become ever more concrete and real, its administration became no

less intricate than that of the state, and hence before this time there had been various unsuccessful efforts to correlate the rules and precedents of religious institutions into a systematic whole. But the *Decretum* at once made canon law also a department by itself, more or less independent of theology, of which it had before been a part, and also distinct from civil law. Thus a new class of students and a new doctorate came into existence. The scope of this new course of study was extremely comprehensive and the method, borrowed from Abelard, was to present both sides in turn of all questions. It is no wonder therefore that this new department shaped and is the key for the understanding of church history, not only in those centuries, when it was no less normative of the destinies of Europe than was civil polity, but in our own age.

(d) Finally, how can a veteran, though humble, teacher of philosophy with this theme avoid even in this imposing and competent presence a word touching the most original of all the intellectual creations of the mediaeval world, the scholastic philosophy, the product of four centuries of earnest, acute thinking, by as pure, devout and learned men as have ever striven to explain the universe, a system so praised on the one hand and so disparaged on the other, that the attitude of every historian of philosophy toward it has long been almost a shibboleth of his creed? Happily of late there is here some *rapprochement* on both sides of the great divide. On the one hand it is seen that scholasticism is not a saurian of an extinct species, but a masterly solution of many of those supreme problems of life and mind that always have and always will both challenge and baffle the great intellects which struggle to know what God and man and nature really are, while on the other side it is seen that later thinkers and their systems are given abundant recognition. No philosophy ever undertook so earnestly the stupendous work of harmonizing faith and reason, of unifying the classic culture with the Christian consciousness.

To this end the happiest possible method had been given by Abelard half a century before the first university was founded, in the fifty-eight theses and antitheses of his "*Sic et Non,*" in which each of the opposite views, often in extreme form, with a place for even an *advocatus diaboli,* and with copious citations, is alternately presented. By this contraposition of authorities the student is stimulated to his uttermost to find out the way of truth. This became a method of such pedagogic effectiveness that it was followed in Gratian's *Decretum,* and in the *Sentences* of Peter Lombard, and became *the* method of orientation in civil law and for sometime even in medicine and science. Thus came in the fashion of debate, controversy,

discussion, and it is the precise method of Abelard which the University of Wisconsin has lately followed in its half dozen extension leaflets on as many themes, outlining both sides of each question, with authorities, for the guidance of the debates it has instigated all over the state. Thus disputations became almost universal. Every student must propound a thesis as a kind of knightly challenge and be ready to maintain it against all objectors. We still find rudiments of this method in almost every European thesis and promotion, while in this country debate, since it spread so rapidly through most of our colleges about 1850 and has now taken on intercollegiate features, is again finding just recognition. In this way humble third member of the *trivium,* logic, came to a commanding position, and this intellectual ju-jutsu method of attack and defence brought the youthful mind to its very best edge and temper. In its higher aspect it was this method by which the ship of thought was steered between dangerous extremes, trimmed and kept on its true course. Controversy (to change the figure) was the pioneer that opened up the highway of truth.

Since the hebemic art of Socrates brought forth concepts, which Plato developed into his ideas, and Aristotle made into categories, they have been the focal theme of all philosophy. Now they have been thought innate in the soul, now moduli in the divine mind after which the world was made, now obtained by induction like the various steps of Porphyry's ladder from the *infama species* the fixity of which Darwin opposed up to the *summa genera.* They even underlie our problems of "imageless thought" and "determining tendency." Kant assumed an even dozen of them, and Hegel sought to organize them into what he thought to be the ipsissimal nature of God. Thus they have been the key to most of the great problems of the ages. Now as Plato strove to make them a new and ineluctable basis of the state when convictions had crumbled under the disintegrating influence of the Sophists, so the scholastics had to turn to them for the basis of the new spiritual kingdom of man's soul. Thus whether universals were before, after or in things was vital to the very existence of higher ideal culture and of ecclesiastical organization and theological truth. If extreme nominalism be true, there is nothing in the world but isolated particulars, as unrelated to each other as the Lucretian atoms, mind plays little part in knowledge, and every type of idealism is a play of empty words. Empiricism is the only philosophy, and sensationalism all there is to psychology.

On the other hand, if extreme realism be true, ideas are all that is really real, the principle of individuation fades, and things if not persons tend to merge into an ever more generic,

if not pantheistic, background. Between these disastrous extremes a broad and safe middle highway must be opened, and justice done alike to the partial truth of both views. This was precisely the problem of Kant, as it also is of Bergson and Eucken and our contemporary realists, with only minor differences of terminology and connotation. It would be only too trite to show in detail how Occam anticipated Locke in his polemic against needless ideas, how Anselm in his famous argument for God was followed by Descartes, and in his *credo quia absurdum* by Jacobi, who found a light in his heart which went out when he tried to take it into his intellect, or how Albertus Magnus did much of the very work of Trendelenburg six centuries earlier than he, how Bonaventura anticipated Schelling's intellectual intuition, and Fichte's blessed life, etc. But such comparisons, which are endless, belong elsewhere.

The great point is that the scholastic thinkers were pragmatists. Their thinking for the most and best part at least was not aimless speculation or romancing with ideas, nor motivated by the lust of evolving individual systems, but it was practical and all to the end of conserving and advancing institutions and ideal worths which they felt to be so inestimably precious that they transcended every personal or merely cultural end. Theirs was far more the work of the practical than of the pure or theoretic reason. Scholasticism tested thus by a new pragmatic sanction meets it supremely well. It did conserve the countless idealisms of cult and faith, and it made the old and the new intussuscept. It also transmitted to later centuries most of the great problems that have never ceased to be the center of philosophical thought. When we have a real and truly genetic history of philosophy, which is still lacking, in which all the even subconscious reverberations of the great schism are transcended, only then shall we realize the inestimable debt that modern owes to mediaeval thinking in these fields. Shall we think the worse of Plato if we agree with Zeller that his thinking was motivated throughout by the desire of saving the state and all that it meant, or of Fichte if his supreme aim was the patriotic one of making his dear fatherland the ego of nations, or of Hegel if we agree with those who regard his system as primarily devised to give a deeper cultural basis to Prussian bureaucracy?

Thus, to conclude, while printing and the multiplication of books and the growth of modern literature and especially of science, have vastly changed the method and the subject matter of academic culture and have brought transforming new views of the universe, theology, classics and philosophy have changed far less in either method or subject matter. Here we still

have much of the same authority of great texts bespun and sometimes swamped with glosses and notes, of lecturing that approximates dictation, and grammar which still remains, though dictionaries have come. Even in the domain of science, the mediaeval Latin of the schools has given us an enormous wealth of technical nomenclature. On the side of organization, university statutes and their administration, especially in Europe, are still more on the basis of Roman than of modern law. Faculty experts in rules and precedents illustrated the "case system" long before its modern use. While appropriations and endowments have vastly increased and brought with them centralization of control, student life has, until the recent athletic movement, added almost nothing not found in the early days of reaction from the strictness of cloistral rule, if indeed it has not lost much of its pristine freshness and romance. As to the relation of studies to life and to the social, political and religious institutions of their time, no university of our own day has been more practical than their mediaeval forerunners. The ideals of academic youth are often said to be the best material for prophecy or the best embodiment of the *Zeitgeist,* and we are often told that as Oxford inclines so England will go a generation later; and so as these mediaeval universities led, Europe followed. There is always a sense in which a university does not consist of buildings, endowments or numbers of students, but is a state of mind. It is found wherever a great teacher and a few gifted pupils are gathered together. In all these repects the more we know of the mediaeval universities the more we shall see that we owe them.

MEASURING THE END-PRODUCT

By Jean Dawson, Normal Training School, Cleveland, Ohio

Can you tell a cherry tree from an apple tree when it is not in fruit? Do you know wheat from oats, peas from beans, a cabbage from a turnip, a rose from a blackberry bush, an oak from a maple, a burdock from a dandelion?

Ninety-seven graduates from ten high schools in one of our large cities were asked to identify these and other common plants and trees growing within a few rods of the Normal Training School which they had just entered to prepare themselves for the teaching profession. The test was conducted in the laboratory. Each specimen bore its own number and each student examined it at her leisure. In every case the specimens were typical. Branches, eighteen inches or more in length were cut from the trees and berry bushes; entire plants, potted or pulled up by the roots were used. No scientific names were required; if a student called a *quercus alba* an oak, she was given credit for a correct answer.

High school graduates fail to recognize the most common things in their environment

The result of the test was a surprise. It is clear that children passing through the public schools acquire very little knowledge of the common things of nature. It was thought that, being city-bred, the girls would know more about city things. Accordingly they were asked to locate accurately ten buildings of the city. The buildings chosen are in the central district and are important from a civic or a commercial standpoint. No answer was counted unless the girl had been born in the city or had lived there at least five years. Although ninety-five of the girls were born in the city and had spent their lives there, twenty-nine per cent could not locate a single one of the ten buildings, and twenty-four per cent could locate but one.

Thinking that the class might be exceptional, a similar test was given to one hundred girls entering the same school the following fall—1913. The results of the tests were tabulated and are given together for comparison:

	Percentage that did not know 1912	1913
[1] Vegetables:		
Squash vine	52	72
Cucumber	61	48
Corn plant	7	7
Carrot	91	18
Parsnips	35	67
Red beet	4	5
Kahl-rabi	75	78
Curled-kale	92	92
Egg-plant	96	91
Celery	8	21
Tomato	22	16
Lettuce	15	6
Wax-bean	20	28
Cabbage	12	7
Radish	67	3
Potato	44	30
Lettuce in seed	75	30
Corn in blossom	2	31
Fruit Twigs:		
Apple twig	45	52
Plum twig	73	93
Pear twig	25	91
Peach twig	11	44
Cherry twig	35	97
Wild Apple twig	72	91
Mountain Ash twig	90	99
American Elm twig	97	76
Locust twig	63	67
White Oak twig	18	42
Sugar Maple twig	6	13
Wild Rose twig	40	89
Blackberry twig	62	86
Raspberry twig	73	77
Plants:		
Chrysanthemum	53	72
Begonia	71	41
Cactus	20	23
Fern	2	3
Geranium	3	6
Ivy (English)	35	57
Grains in head:		
Wheat	79	68
Oats	15	30
Rye	84	79
Barley	79	82

[1] The class of 1912 was given the test two and a half weeks after it entered the Normal School and had its attention called to these plants, while the class of 1913 took the entering week. The advantage of this time probably accounts for the difference in the standing of the two classes. About one-third of each class had had botany in the high school.

Grains Threshed:		
Oats	18	41
Corn	0	15
Wheat	43	56
Beans	4	13
Weeds:		
Dandelion	10	12
Plantain	69	57
Dog's-fennel	85	98
Wild aster	85	94
Burdock	79	95
Lamb's quarters	69	100
Wild lettuce	58	99
Sand bur	68	96
Sweet clover	53	97
Worm-seed	100	100
Curled dock	93	94
Ragweed	92	91
Red clover	4	10

	Percentage failed	
	1912	1913
Buildings:		
City Hall	86	83
W. Building	64	78
Chamber of Commerce	79	84
Principal Savings Bank	88	88
Old Court House	70	73
Old Post-office	89	94
New Post-office	65	83
Principal Hotel	87	83
New Court House	85	75
R. Building	84	95

Looking with unseeing eyes

To adjudge these girls dull would be libelous to the system of grading students in our schools, for be it understood that to enter the normal school, an examination must be passed after graduation from a four-year high school course, or the student must have attained an average standing of eighty-five per cent in all high school subjects.

To attempt to excuse these young women's lack of knowledge on the ground that the objects in question were not familiar to them, would be unfounded. To be sure, in the large city in question, there are congested sections where trees are scarce and gardens few: and unfortunately there are schools located in such districts. Actual facts show, however, that only about two per cent of the students examined came from such districts, the city being noted for its school and home gardens, beautiful boulevards and natural forest parks. The aforesaid buildings too are familiar sights, as all street cars run to the center of the city, and these buildings are constantly referred to in the newspapers.

Feeble powers of discrimination

Upon every page of themes, written by these girls, the confession was made that they have been looking with unobserving eyes. Indeed their power of discrimination is so feeble that they find it difficult to distinguish a potato from a tomato vine, a willow leaf from a peach leaf, and an ash from a hickory. One girl confesses that she can tell the fruit trees only when the fruit is upon them. Twenty-nine per cent of the class of 1913 called a blackberry bush a rose bush. An entire class failed to recognize a mountain ash without its clusters of fruit after they had studied one with fruit for some time. Seeing the Waahoo or Burning Bush with its red fruit, they could not recognize a bush when the berries were green. Ninety-five and nine-tenths of the young women recognized the red beet, but only nineteen and six-tenths of them were sure that a beet was a beet when its color was white. One girl was very much distressed when told that she must familiarize herself with the common vegetables. She said that she had no garden at home and declared that she could not remember having seen one the entire summer. Had this young woman turned her head slightly, so as to have glanced out of the laboratory window, she could have seen, not over a rod away, a vegetable garden which she had passed five or six times daily for three weeks!

As poorly as they discriminate with their eyes, they make less use of their senses of taste, touch and smell. No member of the class was seen to taste or feel of a specimen and only about two per cent of the class made use of the sense of smell. Four out of six college graduates, who took the test, and twenty-one per cent of the high school graduates failed to recognize a fine celery plant, either by sight or by its characteristic odor. All of these young ladies, however, confessed to eating celery and had even bought it in the market.

Lack of knowledge due to lack of interest

In the themes which they wrote upon their study of trees, these young women again and again attribute their ignorance of their environment to a lack of interest. A few of them could remember being interested in trees and plants and losing their interest because of being rebuffed and ignored by their elders; most of them had never before had their interest aroused. Perhaps this is but natural, as few of us are interested in closed books. Let us listen to what some of the girls say on these points. Many of them speak of a growing interest and have given their themes such titles as "An Awakened Interest" and "An Awaking."

"I often used to ask about flowers and trees that I came across but as no one could tell me, I let the matter drop."

"I would often ask some older person the names of plants or flowers and the general answer would be, 'Don't bother,' or 'I don't know.' That would settle it, for if they did not know or care, what did it matter to me? Now for almost a month I have studied trees, weeds and vegetables, and I have had a great awakening."

"I have lived in the country the greater part of my life, but I have really paid but little attention to nature. People have asked me, and I have asked others the names of different plants, trees and vegetables, but that was as far as it went. Sometimes they knew and sometimes they didn't."

"It seems to me that a new world has suddenly opened before me. I have been asleep or rather I have gone through life with my eyes closed. I have become so enthusiastic in my tree study that my folks have begun to study them also."

"I used to look at trees, vegetables and other plants with unseeing eyes. Until September 1912, the only tree I knew was the maple. The fact is, I never thought about the different kind of trees: they were merely a part of nature that I encountered every day of my life."

The following is quoted from a student who comes to the Normal School with a record for scholarship, leaving the high school with an average of over ninety-one per cent and having spent one successful year in college.

"Three weeks of science has made me very inquisitive. I have spent many summers in the country. Often I have asked what the different things were in the woods and could not find out. If someone did tell me the name of a tree, the chances were that I would know it again by its location alone: the same kind of a tree, I would fail to recognize if met in another place. This is because I did not have its distinguishing characteristics in mind and could not compare it with other trees. Now that I am learning to observe every little thing, I can go out into the woods and feel at home with all of the trees, for I am acquainted with them and they are no longer strangers."

Although this young lady has spent many summers on a farm, where all the specimens upon which she was examined grew in abundance, her average was no higher in the test than that of the other members of the class. She did not know an elm, apple or plum tree. She did not recognize a raspberry or a blackberry bush, a melon or a cucumber vine; could not tell a carrot, a parsnip or a potato plant, although she says that she at one time picked up five bushels of potatoes in the field. She knew oats only in the head; could not recognize wheat, either in the head or after it was thrashed.

The class of 1913 were given an additional test on things usually of interest to girls. They were required to identify the names of the women editors of the woman's magazine page of the two evening papers of the city, and they were asked to locate the principal theaters and the shops dealing in women's apparel. Only two and a half per cent failed to

recognize the writers for the women's page in the daily papers and nearly all of them gave the impression that they could go to the shops and theaters; but, strange to say, only eight per cent of them located the shops and fourteen per cent the theaters, so that a stranger could find them without difficulty.

Fail in concise thinking and accuracy of expression

In locating buildings, truly the juggling of real-estate would have paralyzed the business world! Many of the buildings were given no definite location on streets that were miles in length; when the intersecting streets upon which a building faced were given, it was not assigned to one of the four possible corners. Careless, slip-shod thinking was greatly in evidence and was even more distressing than their lack of discrimination and their failure to know beans, corn and cabbage. It sets one to wondering whether the fault lies in the home, the school or the child. In the case of these young women, what happened that the mathematics which they studied during their high school course did not teach them the concise thinking and accuracy of expression that has been claimed for it for centuries?

Conscious that there is something wrong with the school curriculum, why do we go on blindly experimenting when we might learn the cause of the trouble beyond the question of a doubt? Why not, as in the business world, apply the measuring rod to the end-product of our school (the high school graduate) and remodel our school course according to the results found?

NURSERY AND SAVAGERY

By Elsie Clews Parsons, New York City

On a closer acquaintance with savage society nothing perhaps surprises one so much as its utter conventionality. The "wild" savage is a fiction, the "natural man" as artificial as other eighteenth century concepts. Savage life is formal and set; more restricted than life anywhere in civilization—except in the nursery. In both nursery and savagery, restrictions, too, taboos, depend on the force of habit. Right and wrong become synonymous with habitual and non-habitual. Innovations are suspected, perplexing, distressing, unbecoming, bad.

In both kinds of community the avowed source of authority is much the same. "Why do you do this or think that?" you ask savage or child. "Because our fathers bade us or told us," answers the savage. "Because Mother said so," answers the child, remembering perhaps that to his "Why?" Mother has often rejoined, "Because I say so."

In enforcing traditions or rules the ancestral spirits and Mother are at hand to punish or snub originality, but there is a kind of automatic sanction which is also in vogue. Take food taboos, the food taboos, for example, of Australia. If a North Queensland girl eats anything living in salt water, a snake, it is said, will kill her. Meteorites also kill the boys and girls of Queensland who eat forbidden food. In Victoria, they are struck by lightning. If the boys of New South Wales eat the flesh or eggs of emu they will break out in sores. The boys of the lower Murray tribes believe that if they ate emu, wild duck, swans, geese or black duck, or the eggs of these birds, their muscles would shrink and their hair become prematurely gray. If Arunta boys or girls eat parrots or cockatoos, they will get a hollow on the top of their head and a hole in their chin. The breasts of girls eating kangaroo will not develop nor the beard or whiskers of boys eating quail or its eggs. Among the Wakelbura the spirit of forbidden game is thought to enter into its youthful eater, first causing him to utter the peculiar cry and then killing him. We hear of a Kurnai boy, who, having eaten forbidden opossum, was told that he would never grow up to be a man. He did, in fact, lie down under the belief and within three weeks he was dead. Among many other savages, outside of Australia, forbidden food at any age causes skin disease, shriveling up of the body, decay, baldness, death.

What are the supernatural effects of forbidden food in our nursery? Who does not remember having once been told: "If you eat so much candy, it will make you sick," or "it will give you pimples," or "you will never grow up to be strong," or "you won't be a man before your mother?" Or "if you drink so much water, you will turn into a brook," or "so much milk, you will begin to moo?" Or, again, "if you eat oatmeal, it will make your hair curly," or, "if you drink milk or eat the crusts it will make your cheeks pink?" "You don't need so much cake or sugar, you are sweet enough," says

Grandma. And doesn't Nurse keep her charges from swallowing seeds or pits by telling them that vines or fruit trees will grow out of their stomachs?

Like savages, too, children have their own ritualistic food. I suspect that cake, candy, and ice cream, lemonade, tea, and coffee all mean something to them besides a pleasant taste. Wine certainly does. To drink it means that they have passed from one age class to another —whether or not they promise Father not to touch it until they are twenty-one.

In such a pledge smoking is apt to be included. But, with or without the extorting of a pledge in mind, doesn't every parent feel called upon to tell a son—if not yet a daughter—that if he smokes before he is twenty-one he will not grow up to be a strong man? Under like circumstances New Guinea youths are told that their hair will not grow.

Big boys are sometimes accused of taking their first cigarette or their first whiskey and soda because it is a grown up thing to do, but what little boy isn't charged from time to time of wanting to "feel big,"—a strangely grave offense? And are not all children being constantly told that they can't do this or that until they are older? Or that such and such privilege is allowed to so and so because he is older?—an argument the senior is always quick to turn to advantage too for himself. "I know better than you because I am older," parent and elder brethren assert. The argument that "only babies do that," is inhibitory again and again. "Don't cry like a baby," is a common appeal; "you are worse than a baby," a common taunt. A little boy is promised a horse or a gun when he is "big." A growing girl is told that she is too old to play any longer with dolls. "When I became a man, I put away childish things"—because I had to, Paul might have added.

Savages are also very strict about their age classes, always recognizing the prerogatives of seniority and limiting many things besides food and drink to certain ages. A Kikúyu woman of East Africa does not wear copper ear rings until her first-born is initiated into the tribe. Only after initiation could a Queensland youth wear a grass necklace, the human-hair belt, and the opossum string phallocrypt of a man. A Wemba of Rhodesia "speaks his case" only after he is a father. In the Soudanese democracy of Wadai as in many another tribal government young men have little influence and seldom speak in council. In East Central Africa a girl believes that if she does not marry at nubility she will die. Contrariwise, it is as dangerous for an Australian youth who is being "made into a man" to touch or even look at a woman as to eat forbidden food.

Both child and savage are conventional about dress, occupation, and sex in connections other than age. A boy's collars and neckties must be just like those of the other boys—otherwise "they will laugh at you." "Not a single girl I know wears this kind of a dress," is affirmed as an unanswerable argument against it. Neither has a savage any choice in what he puts on. His feathers, beads, and furs are strictly regulated, both in form and material. His ears or nose or lips have to be pierced for ornaments, his skin scarred or tattooed, his skull or features molded after set patterns. With us tattoo is limited to sailors and, it is said, instinctive criminals; *bona fide* earrings are out of fashion. (I am told, by the way, that even the D. K. E. fraternity has given up its initiatory practice of scarification.) But in one particular of personal decoration our children may still remind us of the savage—in haircut or in head-dress. We all know how scrupulous modern man is about his hat, and some of

us find out to our cost that his anxiety about it begins in boyhood—if not babyhood. In the same way solicitude about a girl's hair ribbons antedates that which she feels later about her *coiffe*,—"rats," puffs and switches. As for the hair itself, few mothers are brutal enough to keep a girl's hair short or a boy's long—so great is the emotional cost to all concerned. The hair cut of the savage is just as conventional. Sometimes widows are not allowed to re-marry until their shorn locks grow long again, and a hair-cut or the lack of it is a favorite tribute to the dead. Often it betokens allegiance to deity.

Professional and industrial boundaries are even more impassible for the savage than for the modern wage or salary earner. The medicine-man must serve either a prolonged apprenticeship or go through trying ordeals or inherit his professional secrets. An upstart runs the gravest of risks; for it is far more dangerous to be heterodox in savagery than in civilization. And the savage priest monopolizes his god far more effectually than the civilized. He himself tends to be more and more monopolized by his profession. Finally as a king-god he is an utter specialist, and can never mix with the crowd again. The early mechanic is also a specialist. The smith, for example, must work under set conditions, nor can he change his quasi-sacred job. Moreover it is hereditary. War as well as religion introduces caste into savagery, for warriors and slaves, their captives, tend to be specialists.

Our children have also a sense of caste. Interchange of function in the household they greatly resent. Self-assertive governess or nurse or maid is sure to be met with, "You are not the boss," or "Mother is the only one who can punish me," or "I'll tell Father on you." If let, children keep home and school interests as separate as possible. Moreover "My teacher says so" is unanswerable argument against home views on spelling or arithmetic. It is an unusual child who questions why a "workingman" should be one, or why some people travel in street cars and others in motors, or why the cook gets up at six and Mother at ten. In their mimetic play too this sense of caste,—quite a different thing, let us note, from snobbishness,—expresses itself. Playing together they like their rôles to be fixed. I remember a little boy who was always cast in playing parade for "the nigger what carries the water." Indignant and surprised were the other paraders when he one day rebelled.

But in no respect are children's views on occupational propriety so strongly marked as in sex. Their judgments are frankly stated. "Girls can't play soldier—or policeman." . . . "You can't be the doctor, you're a girl." . . . "Boys can't keep house." . . . "Who ever heard of a boy taking care of the baby?" If by chance a child has had the example before its eyes of a parent engaged in some occupation unusual to his or her sex, the association in the child's mind between sex and the given occupation may differ from that held by other children, but it is none the less fixed. One day Elizabeth Blackwell's adopted daughter, a child of seven who always called her adoptive mother "doctor" was present while a man doctor was calling. After he had left, the little girl went to Dr. Blackwell with a puzzled face, exclaiming, "Doctor, how very odd it is to hear a *man* called Doctor!" Dr. Blackwell probably explained to the child that there were men doctors, but as a rule a child's associations of ideas about sex and occupations are reenforced by its elders. Are not doll houses, toy kitchens and laundries, and dinner sets the proper Christmas presents for a girl; and for a boy, engines and tracks, toy stables and soldiers?

The earliest division of labor was according to sex, and every-

where in savagery it is rigidly maintained. As a rule a man may not be a gardener or a woman a stockraiser. To fetch and carry, to market or shop, is usually so much a woman's business that a man can be helpful to her in such chores only at the risk of ridicule or even infamy. In different tribes of course the sexes may specialize along different economic lines, but once these lines are fixed they cannot depart from them. A Betchuana woman may not milk a cow, nor a man, a goat. Among the Akikúyus twine for some purposes must be made by the men, for other purposes by the women. Firemaking among the Wa-taveita is a man's secret. How best to communicate with the gods and engage their interest is a far more common secret of sex. From secular as well as religious affairs of state women too are generally excluded.

Such differentiations of sex interests must make, of course, for an actual separation of the sexes. In the lives of both savages and children this separation is moreover directly abetted. At an age varying from six or seven to adolescence or even later savage boys have to go into a boy's club house where they can be visited only surreptitiously if at all by their mothers. As for their sisters or other girls, quite commonly they may not speak to them or even pass them by. Of course they must neither play nor work with them. Sometimes little girls are also segregated and until they "come out" they too have to be very careful of appearances. Such ceremonial "avoidance" continues with more or less let-up of course through life. In many a savage village there is a pale beyond which women may not go. The Todas of India have whole villages women may not enter. In many tribes a woman meeting a man on the common trail or road must turn out for him or he for her. As with us, women are regularly excluded from the men's club house and granted only from time to time a "ladies' day." Often in their homes they may not eat with men; sometimes they are confined to their own part of the house,—although haremilk and smoking-room are more characteristic of a later culture.

In its nurseries little girls and boys are kept apart. At seven Chinese boys and girls do not occupy the same mat or eat together, and at ten girls cease to go out from the women's apartments. A Turkish woman, Neyr-el-Nirsa, one of the *désenchantées,* has just been telling us in her "European Impressions" how miserable she was when one day her Koran teacher said that the time had come for her, a girl of twelve, to put on the *yashmak* and the *feradjé* and separate from many of her playmates. The time comes too when we seat our little boys and girls on different sides of the school aisle or tell our girls not to be tomboys or more or less ridicule our boys if they play with girls—a form of derision they seldom, to be sure, expose themselves to. If they do, and if they persist notwithstanding humor in their objectionable companionships, parents become discouraged. "I don't know what to do about Harry, he likes to play only with girls," declares Harry's distressed mother, less resourceful than the old men of the Wiraijuri Blackfellows who pretend to cut out bits of a woman's apron from the legs of a boy overfond of feminine society.

HOW THE ENGLISH TEACH THE WAR

By Charles E. McCorkle, Clark University

In September, 1914, the London County Council sent a circular to all the teachers in the London Elementary Schools mentioning the horrors and heroisms of the war as well as the tolls exacted from each family. The teachers were commended for their true national service in the past, and were shown the duties, obligations, opportunities and responsibilities created by the war which now confronts them. The answering of children's questions, "WHY" the empty chair in the home, the deprived luxuries, the rhythm and tramp of soldiers, the flying of unfamiliar flags, the singing of new songs, etc., become the task and special mission of the teachers and the heads of schools. The homes should be reached through the children, creating a feeling of righteousness of cause and a realization of national need and honor, thus teaching true patriotism, love for country and national unity. It is thought this can be taught best in the schools through Literature, History and English, Economic Aspects, Geography, Study of National Flags, and Prayer,—on all of which later the Council issued suggestions for instruction.

The literature suggested is that which bears upon or has been inspired by war. Not only patriotic poetry and prose should be chosen, but that which "by qualities of imagination and moral insight elevates and fortifies the spirits of readers, young and old." This involves a short resumé of history,—England's three great conflicts, each with a great military power aiming at a world-wide dominion—with Philip of Spain, with Louis XIV of France and with Napoleon. The conflict with Philip of Spain is portrayed in much of the literary spirit of Elizabethan England. Especially did the Napoleonic struggle bring to the forefront such noted men as Wordsworth, Matthew Arnold and Coleridge. For each of the great conflicts, appropriate literature has been suggested.

Concentration of the student's attention upon the main principles and tendencies involved and the events that have led up to the present European war, and a description of the moral and material forces arrayed against one another, should constitute the History and English teaching. Because of the lack of time in the schools, details should be read at home. An historical outline of Europe during the past one hundred years is a prerequisite for the understanding of the present war and its issues. The Napoleonic war, like the present conflict, involved a group of allied powers battling against a military autocracy which aimed at world-wide dominion. The suggested points of fundamental importance for study are, kinds of governments, growth, expansion, foreign and colonial policies, military and naval organizations, etc., of all the nations involved in the great struggle. The Times Literary Supplement contains a detailed bibliography for the teachers.

The economic aspect can be best approached through finance. This demands an explanation of the "nature of bills of exchange, how they are drawn, accepted, discounted and met," etc., how the destruc-

tion of the national and private credit system was imminent at the outbreak of the war, how this destruction would have paralysed industry and commerce, ruining both great and small business men, and how the rush of creditors was met by a series of legal and administrative steps such as the Moratorium, Premoratorium bills, etc. It is thought that some phases of stock exchange and the like may be too technical, but the more general as well as the greater part of all economic aspects may be comprehended in this instruction.

The study of national flags is an interesting, instructive and beneficial topic giving much information along historical, literary, patriotic and symbolic phases.

The Council's suggested prayer is one that needs no comment for it breathes into the souls of the children a message unobtained otherwise.[1]

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[1] For geography instruction, see the March, 1915, issue of the *Pedagogical Seminary.*

BOOK NOTES

The psychological methods of testing intelligence. By WILLIAM STERN. Translated from the German by Guy Montrose Whipple. Baltimore, Warwick & York, 1914. 160 p.

After discussing the nature and problem of testing intelligence, the following topics are treated: the single test and series of tests, method of age-gradation, the principle of the Binet-Simon method, resultant values, with normal children, on the general distribution of the level of intelligence, age and nationality, different social strata, intelligence and school performance, sex differences, repeated tests with the same children, abnormal children, mental arrest, points of view for reorganization and improvement of gradation methods, selection and appraisement of tests, composition of series for the several years, computation of final values, estimation and the testing of finer gradations of intelligence or the method of ranks, teachers' estimations, tests by school performance, rank-orders obtained by tests.

The wayward child; a study of the causes of crime. By HANNAH KENT SCHOFF. Indianapolis, Bobbs-Merrill Company, c. 1915. 274 p.

This book seems especially addressed to those whose interest has not yet been awakened in the work of saving the wayward child. The author's method is to get directly from criminals the story of their lives, for the purpose of finding out what conditions led to their downfall. She secured from a large number of inmates of jails frank statements of their early careers. Her correspondents were evidently genuinely interested and sought to tell truthfully the experiences that led them into conflict with the law and often pointed out what ought to be done to save other young people from a criminal life. She supplemented her questionnaire by direct visits to many prisoners. The author is the president of the National Congress of Mothers and has had long and active acquaintance with reforms in the line represented by this book.

Mental and physical measurements of working children. By HELEN THOMPSON WOOLLEY and CHARLOTTE RUST FISCHER. (Psychological Monographs, Vol. XVIII, No. 1, December, 1914.) Princeton, N. J., Psychological Review Company. 247 p.

This is a very painstaking and elaborate study, setting forth in details the methods, and containing the results, on the following fifteen items: height, weight, visual and auditory acuity, vital capacity, strength and steadiness of hand, rapidity of movement, card sorting, cancellation, memory, substitution tests, completion of sentences, association by opposites, and the puzzle box tests. The work of course abounds in tables and curves. Voluminous as it is, it is "a small portion only of a larger investigation" with a view to a comprehensive study of child labor to show its effects on children who enter industry early. Valuable as it is, it would be much more so if it had a convenient summary.

Education through play. By HENRY S. CURTIS. New York, Macmillan Company, 1915. 359 p.

Dr. Curtis is a pioneer and might almost be called a veteran in the introduction of play and playgrounds in this country, and perhaps he has done more than any other worker in this field. In this work he discusses what is play, play as physical training, play as intellectual training, relations to the formation of habit and character, play in German, English, American and rural schools, place of play in the curriculum, athletics in secondary schools and colleges, recreation at summer schools, a summer playground, summer camp, school as a social center, training of the play teacher, and rules for about a score of games. It is, as the last ought to be, the best book known to the writer of this note on the subject.

School hygiene. By LEO BURGERSTEIN. Translated by Beatrice L. Stevenson and Anna L. Von Der Osten. New York, F. A. Stokes Company, c. 1905. 188 p.

It was well worth while to translate this admirable little manual by the greatest living authority on school hygiene. The ground covered is, first, the schoolhouse, including planning and erection, lighting, ventilation and heating, the classroom and its equipment, other rooms, grounds and facilities. Second comes the hygiene of instruction, treating after general considerations the number of pupils and curriculum, hygiene of different subjects, home-work, examinations, etc., and boarding schools. Third comes instruction in hygiene, fourth, school diseases and medical inspection, and fifth, hygiene of the teaching profession.

Towards racial health. By NORAH H. MARCH, with a foreword by J. Arthur Thomson. London, George Routledge & Sons, 1915. 326 p.

This work treats of the physical, mental, emotional development of the child, the care of children generally, psychological aspects of supervision, nature study and the service of sex instruction, new aids to understanding the biology of sex, ethical training, education for parenthood, and safeguarding. An appendix contains suggestions for parents on how to answer children's questions and how to prepare children for pubertal changes, with a section on special hygiene for girls, the physiology of human reproduction, care of animals, and notes on plant life.

The boy problem in the home. By WILLIAM BYRON FORBUSH. Boston, Pilgrim Press, c. 1915. 287 p.

The first book is devoted to home training for young boys, the child's attitude to the parents, method of government, by punishment and reward, sex discipline, religious nurture, facts for encouragement. The second book is on home training of school boys, which follows the same topics. Book three is on the home training of adolescent boys, and here the author discusses the development of adolescence, methods of government, ruling motives, the prodigal, sex discipline, and religious nurture.

Outlines of child study. By WILLIAM A. MCKEEVER. New York, Macmillan Company, 1915. 181 p.

In the author's lecture trips he has often had to address organizations interested in child study, and here he has brought together his

insights on this topic. As to organization, he treats purpose and promise, plan and fulfillment, officers and members, methods and management, the laboratory idea of child study. Part two includes child study programs, the mother and infant, pre-adolescent boy and girl, vacation activities of the young, adolescent training problems, the problem of fatherhood, vacation and home life, religious training of the young, the country boy and girl. Part three is devoted to child study literature.

Child study; with special application to the teaching of religion. By Rev. G. H. Dix, with preface by Rev. H. A. Lester. London, Longmans, Green & Co., 1915. 134 p.

The author discusses the science of child study, the periods of child life, the growing infant, developing instincts, wonder, curiosity, interest, attention, self-activity, educational and volitional activity, the child of the kindergarten, middle and senior schools, early adolescence, and the religion of childhood.

Discipline as a school problem. By Arthur C. Perry. Boston, Houghton Mifflin Company, c. 1915. 273 p.

Discipline is a problem we shall always have with us. It is considered here first as an individual problem, with the psychology of conduct, intellect, feelings, will, in all sixteen different chapters. Then discipline is treated as a class problem, to chapter 25, and thirdly as a school problem, ending with chapter 34.

Eugenics. By Edgar Schuster. Baltimore, Warwick & York. 264 p.

The author first treats eugenics in ancient times, then passes to Galton and the eugenics of to-day, its relations to evolution, Mendelism, a statistical study of inheritance, its relations to ability, tuberculosis, insanity, feeble-mindedness and epilepsy, the influence of the environment, selective agencies, social control and suggestions for a practical policy, bibliography.

The Chinese system of public education. By Ping Wen Kuo. New York, Teachers College, Columbia University, 1915. 209 p.

This is an interesting study beginning with 2357 B. C. and outlining the ancient system. The second chapter shows its decadence and brings us down to 206 B. C. The third is the development to subsequent times and comes down to 1842. The fourth chapter depicts the transition from traditional to modern education, ending in 1905, while the construction of the modern educational system takes us to 1911. We are then told how education was reorganized under the republic, and present-day problems are treated, followed by a summary and conclusions.

Cartoons in character. By Allyn K. Foster. New York, Association Press, 1915. 192 p.

This book consists of fifty-five short articles, many of which are types of human character, Willie Wilts, Timothy Toady, Chris. Cross, Philip Flabby, Billy Blunt, etc. There are also papers on more general subjects, fiction, heroism, patience, sects, agitation, etc. The articles are snappy, catchy, and show much insight into and sympathy with human nature. The author is a popular and effective preacher and reformer.